# FOOD MANUFACTURE

*Incorporating Food Industries Weekly*

ONARD HILL LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 DECEMBER 1, 1953



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# FOOD MANUFACTURE

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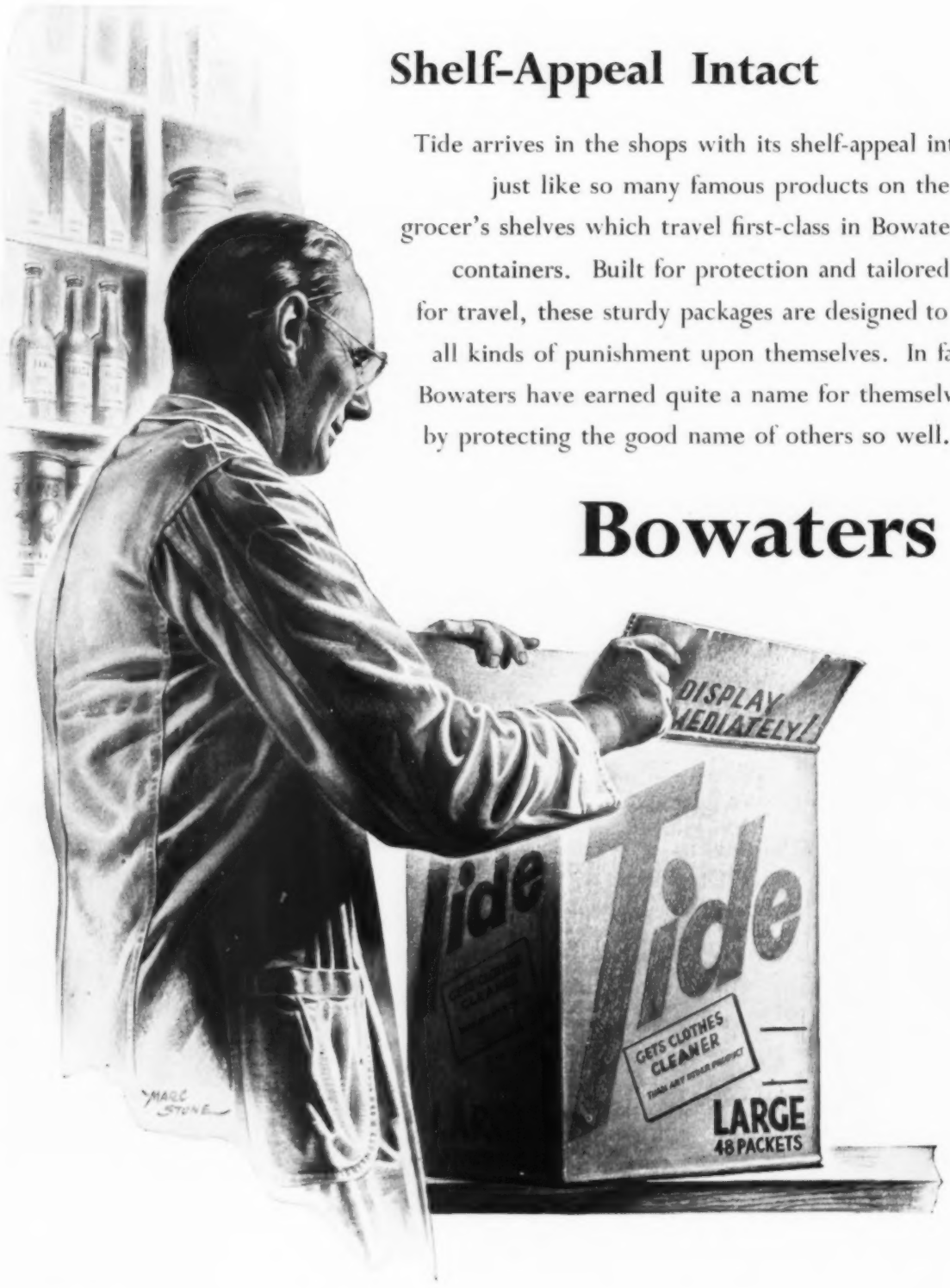


## Shelf-Appeal Intact

Tide arrives in the shops with its shelf-appeal intact—just like so many famous products on the grocer's shelves which travel first-class in Bowaters containers. Built for protection and tailored for travel, these sturdy packages are designed to take all kinds of punishment upon themselves. In fact Bowaters have earned quite a name for themselves by protecting the good name of others so well.

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FOOD MANUFACTURE

Vol. XXVIII, No. 12 December 1, 1953

## *Myxomatosis*

AT the moment of this writing, myxomatosis in rabbits is in the news. Articles are being published daily, the House of Lords and the B.B.C. have taken a hand, and letters are appearing in the correspondence columns. Technical circumstances demand an interval of three weeks between the writing of these lines and their appearance in print. Thus it is that, at this date, a discussion of the subject in all its conflicting aspects would consist of vain repetitions of the pros and cons of food production *versus* rabbits, the gassing of rabbits, the hurried erection of rabbit-proof netting to isolate infected ones, the hard-luck case of the *chasseurs*, here and in France, and the element of cruelty involved in the elimination of rabbits by virus.

The expressions of dismay following the outbreak of myxomatosis among the rabbit population in Kent and Sussex clearly indicate that the epizootic has caught us "on the hop" and it is doubtful whether much can be done about it. What is proposed to be done we shall hear "in the Spring at latest" from the Myxomatosis Advisory Committee, which is now discussing future policy.

The spectacular results arising from the deliberate and organised application by Australian scientists of myxomatosis to the rabbit problem are suggestive of what may happen here, even though conditions are widely different. The knowledge of the way the disease is spread is important. In Australia, during the summer of 1950-51, it was possible to correlate the performance of myxomatosis in the Murray Valley with the distribution and activity of *Culex annulirostris*, and it seemed safe to say that this mosquito had been the principal vector in that area. However, it was impossible to obtain any indication of the vector or vectors responsible for winter transmission, although it was suspected that they were ectoparasites.

There has been considerable talk about the acquirement of immunity, the attribution of the importance of which will surely depend upon the policy which will finally be adopted. The opponents of extermination by virus will welcome its possibilities, while those in favour will take the line of the scientists in Australia, where immunity has been made the subject of a special research project by the CSIRO and the Department of Microbiology in the Australian National University. The results obtained to date indicate that the spontaneous variation of the virus in the past may be the main cause of an increased recovery rate. Sir MacFarlane Burnett has stressed, however, that landowners should not be alarmed at the scientists' statements that strains of virus of lower killing power had been recovered in some districts. At the worst these statements meant that myxomatosis would produce a 90 per cent. kill, whereas the original virus had a killing power of 99 per cent.

Australia's attitude to the question may be summed up by the following statement: Myxomatosis has done a wonderful job, but it may not last for ever. Landowners should use other well-known methods to kill off the stragglers since Australia will never be safe from the rabbit while any survivors exist.

The results of the deliberations of the Myxomatosis Advisory Committee, under the chairmanship of Lord Carrington, will be awaited with interest.

## *Determination of Lead in Foodstuffs*

AT a recent meeting of the Society of Public Analysts and Other Analytical Chemists a paper on the determination of lead in foodstuffs was read by Dr. H. C. Lockwood, who said that the reagent diethylammonium diethyldithiocarbarmate used by the subcommittee of the Society for the extraction of zinc (*Analyst*, 1948, **73**, 304) had been found quantitatively effective with lead at a *p*H of 7·0. This meant that lead could be extracted from solutions prepared from the ash of foodstuffs rich in phosphates at a *p*H at which phosphates were not precipitated. This applied particularly when magnesium was also naturally present, as with cocoa products. The lead complex was decomposed with acids and adjusted to a *p*H of 9. Finally, the lead was determined by extractive titration with a 0·0035 per cent. solution of dithizone in chloroform, 1 ml. being approximately equivalent to 0·5 p.p.m. of lead in a 10 g. sample.

The procedure offered greater accuracy than was attainable with the usual sulphide technique or with the Spekker absorptiometer on dithizone solutions.

Tests on several commodities to which two or sometimes three p.p.m. of lead had been added indicated 80 to 95 per cent. recovery. Results for a number of foodstuffs were given by Dr. Lockwood.

## *Arsenic and Apples*

IF the lower limits of the amounts of lead and arsenic permissible in fruit products, recommended by the Food Standards Committee, come to be imposed, manufacturers of apple juice and pectin products may be faced with a difficult problem. Lead arsenate is still widely used for the control of codling moth on apple trees, the common practice being to spray in June and again in July. According to a paper by C. F. Timberlake and A. Pollard (Long Ashton Ann. Rept., 1952), there appears to be considerable risk that the residues of lead and arsenic left on the fruit from the July sprayings will exceed the proposed new limits.

For fruit eaten raw, the risk would be mainly from lead; in juice extraction, however, the presence of the more soluble arsenic constitutes the greater problem. For cider makers, the difficulties will not be so acute; residues of lead and arsenic are largely removed in the racking-off processes, so that it should be possible to keep within the newly proposed limits for both lead and arsenic.

The position with regard to pectin solutions is not so simple, as so much pectin is made today from the filter-press residues of cider factories. Thus, even though the main product can be safely made, it may be necessary for this large and important section of the fruit industry to devise some means whereby the proposed limits for arsenic will not be exceeded.

The residues on the fruit could be reduced by preliminary washing with a 1 per cent. solution of hydrochloric acid. This remedy might be too costly when only a proportion of the apples used had been sprayed. It seems more likely that buyers will insist upon using fruit that has been sprayed with DDT or BHC. Lead arsenate, with its double hazard of elemental toxicity, is no longer irreplaceable.

## *Public Health and the People*

WHY are we to stop being scientific as soon as we leave our test tubes behind? Why, in our use of the epidemiological method, have we overstressed the importance of the bacterial or other type of agent, and the environment, and paid so little attention to the human host and his socio-economic problems and inter-personal relationship?

Quoting these questions recently put by Dr. Hugh R. Leavell, Walter F. Snyder, of the National Sanitation Foundation, U.S.A., enlarged on the subject in his paper read at this year's Health Congress at Hastings.

The methods used by the industries in marketing refrigerators may be taken as a typical example. While the professional health personnel can justify refrigeration as a health measure, the mere justification in professional terms is inadequate motivation for the purchase and proper use of refrigeration equipment. In recognition of this, manufacturers, while using basic and applied research in designing equipment which is adequate from a technological viewpoint, must also make it fit the needs of people who may use it. This problem is principally, though not exclusively, one to be solved by the social sciences. Regardless of scientific training, the purchaser bases his decision to acquire the equipment upon social as well as scientific reasoning.

The same parallel exists in achieving sanitation through use of the social sciences. Sociology, psychology, economics, anthropology, and political science are all involved in predicting, understanding, or utilising normal human characteristics and human motivations necessary to the achievement of health goals. While most physical scientists in health work will admit that some people have a knack for working with people, they will seldom admit that it has a scientific basis. This attitude constitutes a major obstacle to the expansion of health measures beyond the laboratory into home and community life.

We must utilise the skill of the social scientists in achieving the refinements which will broaden the benefits and make hygiene desirable to the average individual. Variations in culture, economics, social structure, politics, and tradition affect virtually every programme in the field of community hygiene. We have the alternative of understanding and working with the public, other agencies, business, and industry to achieve broad objectives, or experiencing the frustrations of trying to exist in a vacuum.

## *Nitrite in Pork*

A PAPER on the non-bacterial reduction of nitrite in pork is obviously of considerable interest, especially for those meat canners who wish to incorporate bacon or ham in their products.

Dyson Rose and Ruth Peterson of the Division of Applied Biology, National Research Council, Ottawa (*Food Tech.*, 1953, **7**, 369), have found that the soluble materials extracted from pork interfere with the determination of nitrite by the sulphanilic acid/$\alpha$ naphthylamine method.

Any one method of extraction should give solutions having relatively constant interference, and comparisons between samples analysed by the same method should therefore be reliable. Data obtained by different extraction procedures may not be comparable. Used tank pickles also contain pork extractives, but most pickles require extensive dilution before analysis and the error is therefore minimised.

The reducing systems of fresh pork caused a progressive destruction of nitrite which was independent of bacterial contamination. The loss increased as the *p*H decreased and as the temperature increased up to the temperature of protein denaturation.

The oxidation-reduction potential of suspensions of pork was approximately +225 mV. at *p*H 5·9, but

the factors controlling Eh did not control the destruction of nitrite. Some intermediary electron carriers were necessary for the reduction of nitrite by the reducing compounds of the meat. Haemoglobin, and 2 : 6-dichlorobenzenone indophenol were both capable of supplementing the electron carriers and increasing the loss of nitrite. Ascorbic acid, which lowered the Eh of the suspension, had less effect.

## *Fighting Food Faddism*

RELIGION, politics, sex, and food have one thing in common—they inevitably evoke, in all persons, irrational and violent emotions. There is hardly anyone who, however ignorant, is not quite certain that his own views on these subjects are absolutely and completely valid, and that those who hold opposing or even somewhat different views are at the best misguided, and at the worst irresponsible and malicious.

Thus introducing the theme of his address given at a recent meeting of the Food Education Society, with Lord Horder, President of the Society, in the chair, Dr. John Yudkin proceeded to emphasise the necessity for approaching, without emotion or prejudice, but with humble and enquiring minds, the many nutritional problems besetting mankind.

Dr. Yudkin mentioned a few opinions that were widely accepted, and said how necessary it was for the facts to be assessed and the evidence weighed before they were adopted. For instance, one opinion was that everybody should eat brown or wholemeal bread in preference to white. On what was this opinion based? Were we not overlooking the most important principle in nutrition—that if it were a science at all, we must think in terms of quantity as well as in terms of quality? If we were to take most of our diet as bread, it would be of paramount importance to ensure that not the minutest part of some vital nutrient was unnecessarily removed. There might be a few whose diet in this country today contained 50 per cent. or more of bread, but for the majority the remainder of the diet could and should make the colour of our bread irrelevant in relation to their nutritional needs.

Another opinion was that cabbage and carrots were more nutritious when eaten raw, but this should also be looked at from a quantitative angle. Whereas four or five ounces of cabbage or carrot could easily be eaten cooked, it would be rather difficult to eat an equivalent amount raw. It might be true that one of the important nutrients in cabbage, vitamin C, might be reduced to half or less in cooking, especially bad cooking, but as three or four times more of the cooked cabbage would be eaten than of the raw, more vitamin C would be taken. As for carrots, the only important nutrient, carotene, was affected hardly at all by the cooking operation.

Because it was true that some foods lost their nutritional value when they were refined, it did not follow that this was true of all foods. In the case of white and brown sugar, Dr. Yudkin said that he knew of no nutrient worth bothering about in the latter kind, and he was certainly not impressed by the fact that it contained trace elements. For example, he had only to eat an egg to get as much iron as is contained in six to eight ounces of brown sugar. He thought that this was one of several common nutritional fallacies. If we thought that it must necessarily be better to eat whole food, like the whole wheat, because that was how it grew, why were we not logical and insist on eating bananas with their skins?

Another fallacy concerned that of percentage composition, *i.e.* that the only important thing about a food was what proportion of nutrients it contained, irrespective of the amount of food eaten. Potatoes contained far less vitamin C than, say, rose hips, but because so much potato was eaten, it was easily the most important single source of that vitamin for the majority of people. If someone told him that cayenne pepper contained 100 times as much vitamin $B_1$ as bread, Dr. Yudkin assured his hearers that he would remain quite cool.

Probably the most important for those concerned about the problem of world food supply was the fallacy of the panacea. Dr. Yudkin said that he believed it was practicable to ensure that every one of the family of mankind should get the amount and the sort of food which would satisfy his physiological needs. He also believed that to do this was not just a question of "*if only . . .*" If only everyone became a vegetarian; if only enough plankton from the sea, or food yeast from waste molasses and wood, or protein from grass could be produced; if only the growth of population in those countries where it seemed to be rising so fast could be restricted. Such solutions, together with many more, must be exploited and applied simultaneously throughout the world before there could be any substantial improvements in world nutrition.

Those who put their faith in and advocated any single one of these as a panacea was doing a disservice and helping to put off the day when the necessary vast, multiple, and inter-related attack could be made on the most urgent problem facing mankind.

## *Canned White Rice*

THE difficulties encountered in canning white rice caused by the tendency of the grain structure to break down, producing stickiness and "clumpiness" in the canned product, have been overcome by a simple new process devised by R. L. Roberts, D. F. Houston, and E. B. Kester of the Western Regional Research Laboratory, of Albany, California (*Food Tech.*, **7**, 2, 78).

High moisture content or the presence of excess liquid in the can before retorting was found to be primarily responsible for the stickiness and clumping effect. This problem was solved by limiting the final moisture content of the rice to about 55 per cent. and by completing the hydration before the rice is packed in the cans to ensure even distribution of the moisture.

There are four main steps in the process: (1) the raw white rice is washed and soaked in cold water for a period of 30 to 45 minutes, depending on the variety used; (2) the soaked rice is boiled in water for from two to four minutes, depending on variety, or until the moisture content has increased to about 55 per cent.; (3) the partially cooked rice is packed in C-enamel cans and sealed at 28 inches of vacuum; and (4) the cans are retorted for the proper length of time (based on heat-penetration studies for the can size used and packing conditions) to ensure commercial sterility.

The proportions of rice to water used during the boiling step, and the rate of heating as well as the time of boiling, will affect the moisture content of the canned product to some extent. Test runs should therefore be made before large quantities are processed.

The canned rice is prepared for serving by either of two methods: the contents of a 12 oz. can are added to about a quart of boiling salted water, stirred slightly, boiled for one minute, and drained, or the rice can be added to a half cup of boiling salted water and stirred gently until all moisture is absorbed.

Prepared in this manner, the canned rice is comparable to the best quality freshly cooked rice. In fact, in separation of grains, the canned product is superior to freshly prepared white rice and equal to parboiled rice. Other advantages are the speed with which the rice can be prepared for serving and the fact that little skill is required as compared with the cooking of raw white rice.

## *Man of Distinction*

In the feature "Man of Distinction" in a full colour page of a number of leading American magazines appears the name of Mr. Percy C. Magnus, head of the firm of Magnus, Mabee, and Reynard, Inc., of New York, well known in the field of essential oils and drugs in that city. This recalls pleasant and grateful memories of our meetings in 1938 and of the generous help and hospitality he, his brother, and associates accorded to us at that time and during all our subsequent visits to New York.

The apotheosis of an individual may be by way of nepotism, by toeing the party line, and in other ways. The distinction was conferred on Mr. Magnus by a commercial firm, which makes it none the less valid—private enterprise usually has its ears well attuned to the realities of life!

## *Vale!*

In nineteen-fifty-three
From the Minister at Sheerness
Along the corridors of H.M.S.O.
To the giant printing press
Rolling off royal statutes and regs. for army cooks
Issued an order, rustled a murmur
*Print no more ration books!*

Fifty-three million, seven hundred thousand,
R.B. 1.s and little 2.s
Never to be born again, dears,
(One thing less to lose).
A severing of the cord with the grocer, a shooting of the albatross
And our children adrift in an unknown freedom
Minus the little green "boss."

Gentle reader, do you remember
Nineteen-thirty-nine
And the ration books arriving
Covering everything but wine?
"Designed to last six months," they said—a mere bagatelle,
An abracadabra—and every one labelled,
Gipsy's and king's as well.

Do you remember tea,
The "national beverage" rationed,
From Mayfair to Barkingside
Protests impassioned
Fulminating; how, implacably, coupons were cut out
For Lapsang Souchong and can-brewed char,
And the protests petered out?

Do you remember Tobruk,
Alamein, the Malta story,
"Food costs sailors' lives,"
The northern convoys, the sinkings (and the glory)
And the curious ways we stretched the rations with Gran'ma Buggins' help
And how that issue of books with clothing coupons
Raised an almighty yelp?

Waxed the war—D day, V and VJ day—
Furiouser and faster;
R.B. 1 became, in the peace,
Not our servant but our master
Doling out soap, B.U.s, potatoes, egg in shell
And things on Points and Personal Points,
Bananas and oranges as well.

Now cooks and housewives
From Balham to St. Bees
Limber up, unearthing
Forgotten recipes
And shades of Beeton rise again, *au beurre, suprême, de luxe.*
It seems at last that Britain's won
The battle of the books!

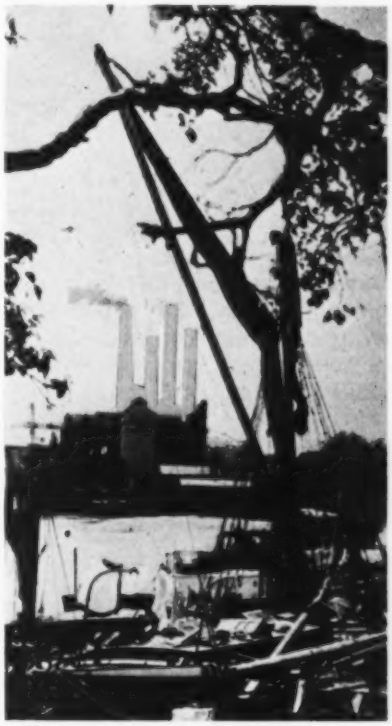
# A Modern Durum Semolina Mill

**In an industry as highly developed as the food industry of this country, it is not often that anyone can claim to have introduced the production of a basic raw material. This, however, is the case with the Chelsea Flour Mills Ltd., the product being Durum semolina. Prior to 1939, although small quantities of white semolina were made in this country, all Durum semolina was imported. With the outbreak of war, imports ceased and the home manufacture of Durum semolina became a necessity. As it was not possible at that time to erect a new semolina plant, an improvisation of existing milling plant had to be devised to meet the situation, but recently a new mill has been installed, a description of which is contained in this article.**

THE first mill started production in London during the early part of 1940, using available milling machinery, based on a very simple flow. As the demand increased it became necessary to increase its capacity. This was done by conversion of other of the company's flour mills to the production of semolina. As time went on it was possible to make the flow more elaborate, but it was only in recent weeks that Chelsea Flour Mills were able to start a completely new plant, incorporating latest ideas for semolina milling.

Of the many grain products used by the food industry, Durum semolina is the essential raw material for the manufacture of paste goods, such as macaroni, spaghetti, noodles, and vermicelli; it is also used as a binder or a filler in many other products.

Although semolina is the term used for the purified middlings produced during flour milling, the semolina referred to in this article is that milled from specially hard, or Durum wheats; of these it is the Amber Durum which gives the best product.



A glimpse of Chelsea Flour Mills.

### Characteristics of Durum Wheat

The nature of the starch and protein from Durum wheat differs considerably from that of bread wheats. When semolinas made from Durum are converted into dough, this dough may be shaped into the many intricate patterns required by the paste goods industry. Not only does the dough retain its shape during the drying process, but also does not disintegrate on cooking as do those made from other semolinas.

It is interesting to note that the number of chromosomes in the Durum wheat is less than in the common wheat and the protein molecule is exceptionally small. It is probably these properties, together with the physical nature of the starch, that make Durum wheat so eminently suitable for the manufacture of alimentary paste goods (Fig. 1).

When the evolution of *triticum vulgare*, the ordinary bread wheat of today, is traced back, it is found that Durum wheat was one of the earliest types known and used as long ago as 3,000 B.C. in the Mediterranean areas for making breads; not breads as we know them today, but unleavened native flat breads. With the widespread use of leavened bread, the wheats more suitable for its production were cultivated, and Durum wheat was used increasingly for the preparation of flat breads and the early form of paste goods which became and still remain a traditional food of that part of the world.

Modern history of Durum wheat started late in the nineteenth century, when Dr. Carleton, an American cereal chemist, looking for a wheat which would withstand a severe winter and a short, hot summer, brought Durum wheat from Southern Russia to the United States. In the following years this wheat was tested under different climatic conditions, and is today well established in the Canadian provinces of Manitoba, Sasketchewan, Alberta, Ontario, and in the States of South and North Dakota (Fig. 2).

As Durum wheat was not suitable for bread making, it took a considerable time to establish a demand for it in the Western Hemisphere. Today, however, the increased consumption of macaroni products in America, Gt. Britain, and Europe, brings Durum wheat to the forefront as an important cereal.

While other wheats are in good supply, crop failures of Durum have created a world shortage which will continue for some time. Therefore, it is of the greatest importance today to have a mill capable of utilising it to the best advantage.

### Selection of Wheats

In addition to the inadequate machinery for milling, another handicap to the production of good quality semolina was until recently the inability of the millers to select the most suitable wheats. During the war and post-war periods, selection was impossible, and bulk buying and allocation by the Ministry of Food gave no

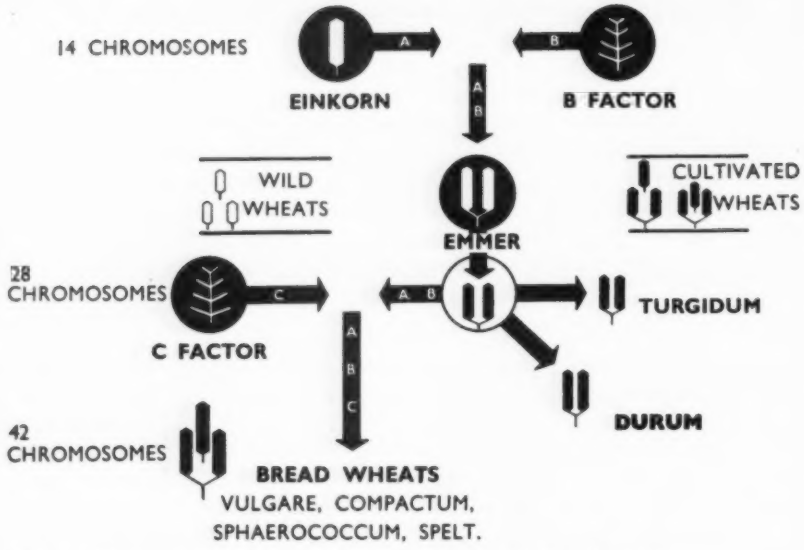



**Fig. 1. Diagrammatic representation of the evolution of Durum wheat.**

choice to the miller. With the end of flour milling control at the end of August, 1953, the milling industry was once again free to select and buy wheats most suitable for their products.

Chelsea Flour Mills were then able to put into operation the plan they had been preparing during control—to mill a semolina equal in quality to any produced abroad, giving the paste goods industry the opportunity to compete on quality with imported macaronis.

### Semolina Milling Process

In many ways, flour and semolina milling follow the same pattern, the main difference being that in the case of flour milling it is possible to achieve the separation of final traces of bran from the endosperm by sieving after the reduction system, where the bran is flattened and the more friable endosperm powdered. As there is no reduction in this sense in semolina milling, it is necessary to remove all the bran by extensive purification. The essential stages common to both flour and semolina milling are as follows: (*a*) wheat cleaning; (*b*) grain conditioning; (*c*) breaking open the grains and cutting away the endosperm from which the flour or semolina is made; (*d*) purifying the released endosperm particles; and (*e*) reducing the purified particles to required size.

### Removal of Impurities

In the semolina milling process (Fig. 3) as carried out in the new plant, the first step is to remove the impurities, which even the most carefully selected wheats contain. This is done by a series of machines which sieve out the very large or very small particles

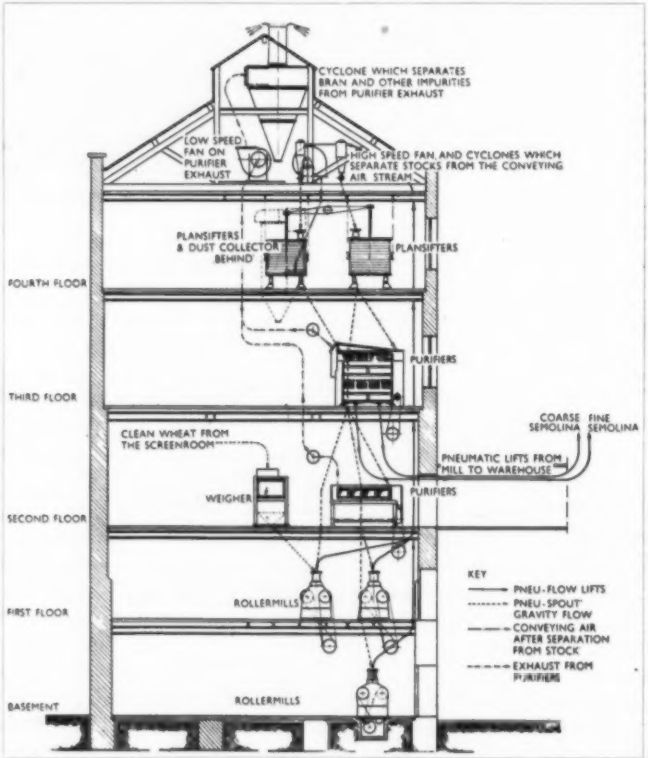



**Fig. 2.** (*Left*) **The main areas of the world under Durum cultivation.**
**Fig. 3.** (*Above*) **Flow sheet of the operations at the new plant at Chelsea.**

and subject the wheat to air currents which carry away any dust, chaff, or light impurities. Particles adhering firmly to the skin of the wheat are removed by scouring and brushing. After dry cleaning, the wheat passes along a washing worm where stones and crease dirt are eliminated. The cleaned wheat is stored in bins to bring it to the right condition for milling. After passing through another brush machine it goes *via* a magnetic separator, which removes any metal particles, to the milling process proper.

**Fracturing the Wheat**

The first stage of the milling process is the breaking open of the grain. Rolls of chilled iron, faced with finely graduated and sharp-edged flutes are used for this purpose. On passing between the rolls each grain is caught by the flutes of a slow moving roll, while the sharp edges of a faster moving roll shear it open and cut away part of the endosperm. By careful adjustment of these rolls it is possible to ensure that the endosperm is smaller than the fractured wheat from which it is cut, thus enabling separation by sifting. After sifting, the fractured wheat passes to further break rolls, and by a process of alternate shearing and sifting it is possible to reach a stage where the greatest part of the endosperm has been separated from the bran.

**The wheat is fractured and the semolina cut away from the bran in roller mills. The endosperm and the bran are then lifted vertically by the "Pneu-Flow" system to the top of the building.**

**Sifting and Grading**

The "grind" from the break rolls, situated on the lower floor, is carried by the "Pneu-Flow" pneumatic system to the top floor, where after separation from its conveying air by cyclones, it falls on to the plansifters. Plansifters are superimposed sieves of woven wire cloth; by careful choice of the mesh of the wire cloth it is possible to separate a substantial portion of the bran from the endosperm. Bran of the same size as the endosperm is inevitably made, and this has to be dealt with by the purifiers.

The particle size of the endosperm, separated on the break rolls, varies widely. Before passing into the purifiers, which deal best with particles of similar size, it is graded on another series of plansifters, each grading being sent to a separate set of purifiers. The quality of the final semolina depends largely upon the efficiency of these machines.

**Removal of Bran**

In the purifiers, the endosperm passes over silk sieves through which air is drawn from below. Pure endosperm, being the heaviest, passes through the cover, the lighter, impure particles being retained and overtail the end of the machine. This material is reground, graded and repurified. The very lightest particles, mainly bran, are carried away in the airstream and join the bran separated by the break system.

Up to this point, the endosperm has been kept at a size convenient for separating bran from it. It is then necessary to bring it to the size required in the finished product. This is done by means of a further series of fluted rolls, great care being taken to keep the semolina sharp and to avoid making flour. After sizing, the endosperm, or as it is now known, semolina, passes to the plansifters, where it is again graded before being repurified. It is by this repeated sizing, grading, and purification that all bran is removed from the semolina.

The process yields four main end products: coarse semolina, fine semolina, flour, and bran.

**Laboratory Control**

At all stages, strict laboratory control of the process is maintained, thus ensuring a product of the highest quality, free from bran and other impurities, and of a grade suitable for the trade.

*Above:* **Other roller mills are situated on the first floor. The slim pneumatic elevating tubes and the hygienic metal spouting are to be seen here.**

By virtue of the completely automatic nature of the manufacturing process, the product is untouched by hand. Stocks, at all stages of the process, pass from one machine to the next in endless streams, through metal spouting used both for gravity and pneumatic conveying, thus ensuring freedom from contamination. Consequently, although a considerable knowledge of the technique of control is essential, the number of operators employed is reduced to a minimum.

**Bulk Storage**

Under construction, adjacent to the mill, is a new warehouse, designed to hold 250 tons of semolina in bulk. Bulk storage bins will be linked directly to the mill by an extension of the pneumatic conveying system, and when completed will enable supply by bulk transport wherever required.

The amount of space available at the Chelsea site was very limited, and in order to put in a plant capable of producing 25 sacks of semolina per hour, all methods which would save room were closely examined. Of the various proposals considered, two were adopted: (*a*) the "Pneu-Flow" elevation system, which made it possible to put roller mills

*Right:* **The "grind" from the break rolls, situated on the lower flow, is carried by the "Pneu-Flow" pneumatic system to the top floor where it is separated from its conveying air by cyclones.**

*Above:* **Some of the plansifters which repeatedly sift and grade the semolina during the milling process. The dust collector is seen behind, and beyond that another plansifter.** *Below:* **A close-up view of the purifiers which remove all bran and impure particles from the semolina.**

in the ground floor without having to raise the rolls or dig extensive pits, and (*b*) the use of quadruple purifiers, which halved the space required by the orthodox double purifier, a very important consideration in view of the extensive purification required.

The pneumatic conveying system was chosen for reasons of space, but even had this been unlimited it would have been used in preference to the conventional bucket elevator, not only because of its cleanliness, but also because it reduces the hazard of insect infestation, which always has to be carefully guarded against when milling cereals.

Much of the machinery in the new mill was supplied by Thomas Robinson and Son, who also carried out installations in the closest collaboration with Chelsea Flour Mills and MIAG of Brunswick. They also supplied the grain cleaning machinery, the new line of roller mills in the basement, and the dust collecting system, following their "Pneu-Flow" system of elevation.

"Pneu-Spout" gravity conveying was chosen instead of wood spouting, owing to the very short time available for the reconstruction, as well as for its more obvious advantages.

In collaboration with the technical staff of Chelsea Flour Mills, MIAG, who supplied the quadruple purifiers, prepared the flow and layout of the mill.

The purifier exhaust system was designed and installed by Renown Metal Works.

## More about Dietetics

Now that so many books on diet are being published, the anxious enquirer must be hopelessly confused by the multitudinous and conflicting instructions to be followed in order to achieve radiant health and energy.

One of the latest books* in this field promises youth and beauty even in its title. From time immemorial, the lure of the *elixir vitae* has attracted mankind, and the author plays on this theme throughout the pages, the elixir being protein, protein, and more protein, although it must not be pork in any form, or under any circumstances. His style is anecdotal and somewhat reminiscent of high pressure commercial propaganda, although he is selling ideas instead of nostrums. What better bait than the promise of youth and beauty? Mephistopheles did this with Faust with somewhat different motives.

An example of the style of the book may be gathered from his descriptions of the endocrine glands. The pituitary gland bestows "11 blessings" upon its owner (the list is too long to quote, but among them figure plenty of initiative, sustained interest in life, vigorous sex tone, and prolonged youthfulness) if it is nourished by high-protein foods. Similarly the author treats the other glands—the thyroid (which "sets the pace"), the adrenals ("your glands of survival"), the pancreas, the gonads, and so on.

Grave warnings are given, with examples cited, of the dismal fate of protein-starved males. "Several years ago a group of sexually normal men were placed, as an experiment, on a diet containing extremely low amounts of protein. Within a short time they lost all interest in women; bathing beaches, windy corners, and ringside tables at night clubs held no special appeal for these otherwise normal males."

There follows a chapter containing "Six Commandments for a Long 'Young' Life." High-grade proteins form the subject of the first one; calcium and other minerals another. The author quotes a Dr. Crompton: "Calcium poverty is one common cause of ageing that can be corrected." He prescribes "a grain of calcium lactate for each year of your age, taken in three doses three hours after each meal."

The reader is advised to learn the six commandments by heart. He is also commanded (all through the book the pronoun "you" is used) to take "laboratory fresh vitamins"; to abjure sweets; to slim with reason.

In common with a number of similar books, it does not give references or a bibliography. A typical phrase, irritating to the critical reader, is "as a doctor from New Zealand commented to me . . ." but where or when is not told.

The trouble with a book of this sort is that the author bends his arguments to one main theme which amounts almost to obsession.

A book† of another colour is one edited by Prof. V. H. Mottram, whose years of experience in the study and teaching of nutrition, and practice in its popular exposition, render any book under his sponsorship worthy of attention.

The problem confronting the writer on subjects inextricably associated with technical and scientific conceptions is to assess accurately the absorptive powers of the minds of his readers. Whether the full meaning of such terms as proteins and carbohydrates is known to the layman is doubtful, hence the value of the clear exposition contained in this book.

We are told that the book "explains the subject in a simple way and should prove invaluable to the housewife, the prospective bride, those who have the care of babies, children, and invalids, and the student," and that it might also be read with advantage by the men of the family.

The book is well balanced, the style is objective, and the information well authenticated and, contrary to some, is one in which it is difficult for the reader to lose his way.

In such a consistent book, the pictures showing the washing of dinner plates in the scullery, and ones of a similar nature, together with microphotographs of vitamin $B_{12}$ crystals and Petri dish cultures of bacteria, appear to one reader to produce a somewhat heterogeneous effect.—T. C-W.

* *Eat and Grow Younger*. By Lelord Kordel, Sc.D. Pp. 240. Herbert Jenkins. Price 15s.

† *Food Sense*. Edited by Prof. V. H. Mottram. Pp. 224. Ward, Lock and Co. Price 15s.

## Sugar Cane Cultivation

HARDLY any crop, and certainly no tropical crop, has made greater strides in the manner of its production or in the yields which it gives per unit area than has the sugar cane during the last 50 years. Today sugar cane cultivation in all its aspects has, under the influence of research, changed out of all recognition. Gone are the days when the manager or owner of a small sugar plantation of 100 acres or so could be regarded as combining in his own person all the knowledge and skill required in the production of cane sugar from the time the cane is planted to when the final product is placed in sacks ready for the market. Indeed, of late years it has become accepted, to an ever increasing degree, that the business of growing cane has to be separated entirely from that of converting it into sugar, and that the management of the field side of the industry is every bit as complicated a business as that of running a sugar factory, from which it is best kept separate and distinct.

It is curious in these circumstances that until now there should be no published work dealing with the agricultural side of the cane sugar industry as opposed to the manufacturing side dealing with the manipulation of the canes for the extraction of sugar.

Mr. Barnes has rendered a valuable service in writing the present book,* which in his preface he modestly refers to as a compilation. In fact, it is a good deal more than this inasmuch as it embodies a great deal of material which can only have become available as the result of his own experience as a scientist, an observer, and an administrator in the field side of the sugar industry in a number of countries.

The book itself, after a brief introductory chapter, starts with a review of the conditions under which cane is grown in the principal producing countries; of necessity this is rather in the nature of a series of thumbnail studies, inasmuch as any attempt at detailed treatment would demand a whole book. Nothing of this sort so far as the reviewer is aware has been attempted since the publication of Geerlig's book on the world's cane sugar industry in the opening years of the century. Nevertheless, the chapter is certainly useful as a brief general conspectus.

The remaining chapters are concerned with discussing the various aspects of cane cultivation, including planting, cane varieties, cultivation, drainage, irrigation, manuring, and harvesting the cane crop. There are also chapters on mechanical cultivation, sugar cane soils, the planning and planting of sugar plantations, as well as on the management of plantations and the supervision of staff, the keeping of field records, the control of cane fires, methods of computing prices of farmers' canes, and a number of other practical matters of management.

As he states in his preface, the author is fully conscious that in the treatment of so wide a subject omissions must necessarily occur, but the manner in which he has covered his subject is reasonably comprehensive, while the writing is characterised throughout by a lucidity which is as admirable as it is exceptional. The book can be safely recommended to the large audience of agronomists and field and managerial staffs on sugar plantations throughout the world to whom it is primarily addressed.—H. T.

* *Agriculture of the Sugar Cane.* By A. C. Barnes, C.M.G., B.Sc., F.R.I.C., A.M.I.Chem.E. Pp. 392 + x. Leonard Hill Ltd., 9, Eden Street, London, N.W.1. Price 42s.

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## Dairy Engineering in America

DURING the last 25 years, immense strides have been made in the mechanisation of milk handling and processing. It is surprising, therefore, that there should be so few text-books for students of dairy technology on the engineering aspects of their subject. The second edition of one,* which originally appeared in 1942 and which was virtually the first book to be devoted entirely to this subject, has now been published.

In the main there is not very much difference between the two editions except that a certain amount of new material has been added here and there, and two chapters in the first edition on pumping and pipelines have been condensed into one chapter in the second edition. More emphasis has been given to hygiene and sanitary types of construction and equipment; this has become necessary in view of the rigid health department requirements in America.

The volume covers properties of milk, mechanical principles, electric power and equipment, pumping, heat, steam, refrigeration, ice cream plant, homogenisers and pasteurisers, evaporating and drying, can and bottle washing, cream, butter, and cheese equipment, and dairy plant design and layout.

On some of the more chemical aspects of dairy engineering it might have been advisable if the author had had a chemical engineer as a collaborator or at any rate as an adviser. Such points as the treatment of feed water for boilers and the exact meaning and use of detergents today would then have been dealt with rather more accurately. There are a considerable number of such small errors and ambiguities, especially with some of the formulae and figures on the one hand and the corresponding text on the other. It must also be noted that this book only describes American plant and processes, and gives no recognition of European or Australasian equipment and practices.

The text and the majority of the line drawings are cleanly printed, but a good many of the photographic reproductions in the reviewer's copy are so heavily inked as to be virtually unintelligible. Bearing these disadvantages in mind, however, the book should be useful for students and plant personnel to give them a picture of dairy engineering in the U.S.A.—A. W. M.

* *Dairy Engineering.* By A. W. Farrall. 2nd Edition. Pp. 477 + xvii. Chapman and Hall. Price 48s.

Rabbits watering on Eyre Peninsula, South Australia.

# Rabbits in Australia

A. L. Kidson

**In view of the very serious rabbit situation that developed in Australia in the years immediately following the last war, it was decided to re-examine the practical possibilities of the reduction of the pest by their infection by myxomatosis. In 1950, seven liberations of the virus were made in the Murray Valley and although these preliminary trials were disappointing, further work has subsequently been carried out which has afforded spectacular results, the latest estimates setting present rabbit numbers at perhaps one-fifth of the pre-myxomatosis figure. In view of the fact that there have been outbreaks of the disease in East Sussex and Kent and in France and that energetic measures are being taken to examine the position in Great Britain, this article, written from the Australian standpoint, will be of interest.**

TWO conflicting interests are involved in the rabbit question. Graziers, dairy farmers, and wheat growers in Australia and New Zealand have no illusions about the "economic value" of the rabbit; from early settlement days it has been their greatest enemy. At the same time, it is a revenue earner and a food producer, and the difficult question now posed is whether this industry should be suppressed along with the rabbit itself.

Year after year, both countries have had to spend millions of pounds and an untold number of man-hours on poisoning, trapping, ferreting, gassing, and other control methods.

Yet despite this vast expenditure, extending over three generations, the rabbit has multiplied and spread. The number has been estimated lately at no less than a thousand millions. The recent alarming increase is largely attributable to post-war shortages of man power and control materials, especially close-mesh wire netting for rabbit-proof fences, of which there are many thousands of miles in Australia.

### Meat Output Suffers

The effects of such hordes on the country's food producing potential have been incalculable. It is generally agreed that five or six rabbits eat as much grass as one sheep. A quick calculation will thus show what the rabbit has been costing in the way of reduced lamb and mutton production. The output of beef and dairy produce has likewise suffered.

Choosing the best fodder grasses first, the rabbit soon eats the heart out of good grazing land. On poorer country the pest is equally disastrous. Cropping close to the ground, it strips the soil of all plant cover; on marginal and desert lands it attacks the scant scrub-growth, and ring-barks trees. In that way great deserts form, especially in the arid inland areas. Official reports give staggering figures of the erosion and soil losses thus attributed to the rabbit. Grain and root crops likewise suffer from these depredations.

### Profits from Skins and Carcasses

On the other hand, the substantial revenue that has accrued from the sale of skins and carcasses cannot be ignored. These, the trade points out, earn dollars and sterling, and so help to balance the national accounts. It is logical to profit where possible from the destruction of a pest, but will it ever be eradicated, or even effectively controlled, while its persistence remains profitable to many? Will not the rabbiters deliberately "farm" the rabbit, by such practices as sparing the young (and commercially worthless) animals, to make sure that it does persist? That has been Australia's problem.

Rabbit proof fence in Western Australia.

When prices are good (skins averaged nearly 10s. a pound in 1946) professional rabbiters earn as much as £80 to £100 a week. This encourages operations and so produces more carcasses. To cope with the supply, large city firms send refrigerated vans into the "outback" to buy the meat, for both the local and the export trades.

*Unit—Crates of 24 Rabbits.* *Approximately 56 lb. per crate.*

| *Year Average,* | *Furred* | *Skinned* | *Total* |
|---|---|---|---|
| 1935-39 | 177,000 | 88,000 | 265,000 |
| 1945 | 23,000 | 82,419 | 105,419 |
| 1946 | 13,000 | 154,000 | 167,000 |
| 1947 | 235,209 | 401,832 | 637,041 |
| 1948 | 637,581 | 439,628 | 1,077,209 |
| 1949 | 2,011,078 | 258,269 | 2,269,347 |
| 1950 | 139,648 | 188,300 | 327,948 |
| 1951 | 613,528 | 598,314 | 1,211,842 |

Mosquitoes enclosed in glass tubes bite infected rabbit. About one in four of the mosquitoes picks up some of the virus which it passes on to another victim.

High prices in Australia for beef, pork, and mutton have stimulated the local demand for rabbit carcasses. Large city firms and strings of butcheries in the suburbs and the country handle many thousands daily. In the Table are shown figures supplied by the Commonwealth Department of Commerce and Agriculture giving the surplus quantities that have been available at the same time for export.

Added to these must be the large number of animals destroyed but never brought to market, through the gassing of underground burrows, for example, or the lack of transport in remoter areas, and the numbers remaining alive and untaken.

### Control by Myxomatosis

Myxomatosis, an epidemic disease artificially launched, is now controlling infestation. Hundreds of millions have been killed by the disease alone in the past two years, and further drives are being made by scientists of the CSIRO and all State Governments. The falling-off registered for the year 1950 was deliberately arranged to relieve the strain on storage in the U.K. following phenomenal imports the previous year. By averaging the export figures for 1950 and 1951, however, a downward trend becomes apparent, and will no doubt continue as a result of these latest campaigns.

The decrease in the rabbit population by myxomatosis has resulted in a considerable increase in primary production which for the past season alone could be valued at more than £50 million.

Quick method of infecting rabbits advised by the authorities is to make a swab from a match and a twist of cotton wool and transfer the virus from the eye discharge of an infected rabbit.

#### Last Season's Epidemic

Mr. F. N. Ratcliffe, Officer-in-Charge of CSIRO's Wildlife Section, has reported that the main features of the past season are the spread of the disease beyond the areas that had benefited in the previous summers, and also some very interesting winter kills (*e.g.* in the Western District of Victoria). In areas where the disease had worked well previously, and rabbits had subsequently bred up, last summer's epidemic dealt effectively with the increase. It is now almost impossible to find an area in the east to which myxomatosis has not penetrated.

Although there are a few regions where the kill has been poor, the rabbit situation in the four eastern mainland States (Queensland, New South Wales, Victoria, and South Australia) is better than at any time in living memory.

It is reported by Mr. B. D. Robinson of the Victorian Department of Lands that the overall reduction in rabbit numbers in Victoria has increased to 80 per cent. during the past season, compared with only 60 per cent. in the previous year.

Mr. C. D. Gee, Stock Inspector of the Pastures Protection Board, injecting the virus into rabbits from the property of Mr. N. Scholefield at Eulah Creek, near Narrabri, N.W. New South Wales.

Mr. Grahame Edgar, of the N.S.W. Department of Agriculture, said that myxomatosis now covers the whole of New South Wales. There are practically no rabbits left in the West Darling country.

In Queensland, Dr. P. L. Graham, Co-ordinating Board Secretary of the Department of Public Lands, estimates that there has been an overall decline in rabbit numbers in Queensland of from 75 to 90 per cent. since myxomatosis started in 1951.

#### Resistance to Myxomatosis

Scientists are now studying the problem raised by the increasing proportion of recovered rabbits found in certain areas. Although this new development has not so far significantly affected the overall position, it may become an important factor in future years. Changes in the resistance of the rabbit are being studied and strains of the virus isolated from outbreak areas are being tested in the laboratory for possible changes in virulence.

Through the co-operation of a local landholder and the New South Wales Forestry Commission, a special area of land is being acquired in the Riverina, on which the performance of the disease in an undisturbed rabbit population can be intensively studied. This experimental area will provide a convenient site for the field testing of selected strains of the virus.

#### Disease Harmless to Humans

The effect on the local market has been drastic. After reading about the disease or seeing infected animals, Australians refused to eat rabbit and the mainlanders actually imported shiploads from Tasmania, where the virus disease had not hitherto been disseminated.

According to the opinions generally held by Australian experts, consumers in the U.K. need have no fear of eating rabbits infected with myxomatosis; neither their skins nor their carcasses are passed for export, and a close watch is kept by Government inspectors. In any case, the disease is quite harmless to human beings and all other animals; no less an authority than Dr. I. Clunies Ross, head of Australia's CSIRO, has confirmed that rabbits so killed can be eaten with safety. To prove the point of non-transmissibility, he and two other leading scientists were voluntarily infected with the virus without sustaining the slightest ill-effects.

## American Scientific Developments in 1952

PRODUCED jointly by the five Missions who together make the British Commonwealth Scientific Office (North America), namely those from the United Kingdom, Canada, Australia, New Zealand, and South Africa, is a review* of science in the U.S.A. for the year ending June, 1952.

The review begins with a general account of the distribution of scientific effort within Federal, industrial and university institutions; where possible, the contemporary situation has been put into perspective by giving statistical material dating back to 1941. The survey is followed by three items describing some of the more important recent developments in the Federal Government (conservation of materials, the National Science Foundation, and the Interdepartmental Committee on Scientific Research and Development).

A series of reports on progress in different fields of science and engineering comprises the remainder of the review; this covers most of the important developments during the year, although emphasis is given to those subjects which have been investigated by the staff of BCSO(NA).

The section entitled "Biochemistry of Food Processing and Preservation" is mainly concerned with the chemical mechanisms of deterioration in the protein, carbohydrate, and lipid constituents of foods.

It is reported that at the Eastern Regional Laboratory of the Bureau of Agriculture and Industrial Chemistry, investigations are in progress on the nature and control of reactions of the browning type in maple products; on large scale separation of some of the amino acids from protein hydrolysates by fractional distillation of the N-acetyl esters; on the evaluation of the water-holding capacity of casein in relation to its polar groups; and on the number, nature, and reactivity of its free amino groups.

At the Western Regional Laboratory, where deteriorative mechanisms in dried egg have been under investigation for some years, the relative merits of removal of glucose by yeast and by enzyme have been compared, and at present the advantage seems to lie with the yeast-fermentation process.

Work is also being carried out at this laboratory on the deterioration of shell eggs during storage in relation to individual constituents and on the development of fishy off-flavours in turkey meat in relation to highly unsaturated fat in the diet. A method for the drying of potato mash powder, in an "air-lift" type drier which, it is claimed, greatly reduces damage to the granules, has been developed.

Included in the work at the Northern Regional Laboratory has been the long awaited demonstration of the Amadori rearrangement in aliphatic N-glycosides and of its probable relation to browning.

Mention is also made of the rapidly increasing use of antibiotics in the feeding of farm animals, particularly pigs and poultry. Although opinions differ as to how much food is saved, when antibiotics are used under the conditions existing on many American farms, it does appear that the animals are ready for market in about 80 to 85 per cent. of the time previously required to bring them to this condition.

The retarding effect of freezing and thawing on the subsequent growth of bacteria on meat is among projects related to meat quality and preservation under investigation at the U.S.D.A. Meats Laboratory at Beltsville. A comprehensive programme of research on quality in meat is also in progress at the laboratory of the American Meat Institute of the University of Chicago. The observation at this laboratory that the labile sulphur content of the raw meat seems to be correlated with meat flavour in the cooked meat will, if confirmed, bring a useful tool to workers in this field.

* *The BCSO Review of Science in U.S.A. for the year ending June, 1952.* Pp. 40+iv. H.M.S.O. Price 2s. 6d.

## The Part Played by Science in Agriculture

THERE is no reason why a recently published book,* albeit belonging to one of the "hunger ahead" variety with which we are growing familiar, should not be studied on its merits. As one who laments the passing of Massingham for the much pleasure he has given me, I should call the work (in so far as it is his) a fitting testament. Moreover, the thesis is a salutary one. No one is very likely at the moment to revolutionise the farming system in this country; but if we are forced gradually and by very painful experience to try to produce, say, 85 or 90 per cent. of our food, some at least of the steps advocated by the authors will have to be taken. If or when that time comes, a few of those responsible for our affairs may have read the book and may dimly recall its more useful ideas.

The essence of the sermon, however, whether the writers admit it or not, is that science has been making a mess of our agriculture and our food processing. I know that they agree that a little artificial fertiliser is a good thing, that some farm machinery is very valuable, and that not all processing is harmful. But that would be the effect on the mind of the lay reader.

What is the origin of this common bias? It amounts no doubt to a notion that, if men in the past were ever harmed by the foods they consumed, this was, after all, only natural; they had no choice in the matter; they had fallen into the hands of God and not into the hands of man. This of course is undeniable; and it is also undeniable that techniques may still be applied to food production or preservation merely to effect profitable sales. It is true, too, that while the public still has cause to suspect the motives of those who sell them their food, they can never feel quite safe with "improvers," and insecticides, and flavourings, and all the rest of it.

When the honest broker of a scientist or technologist is desperately trying to raise yields and

* *Prophecy of Famine.* By H. J. Massingham and Edward Hyams. Pp. 192. Thames and Hudson. Price 12s. 6d.

prevent waste in face of a rapidly rising population, he must, I think, be given more chance to conspire with nature in his efforts. He may at times go wrong, and certainly many of the new compounds need watching. Still, we can usually trust the scientific world, if left to itself, to recognise its errors sooner than will any other section of society. That is what the scientist is trained to do through the normal process of internal criticism and repeated experimentation; on the whole he performs his work efficiently, provided it is not interfered with unduly by political or commercial interests.

The authors seem to me to go a little too far when they choose to speak of "peasants" without a clear definition of the term as applied to farming in this country. They are on the defensive, too, about peasant efficiency the world over. They have no need to be. Most agricultural economists agree that the Indian or African cultivator is a very shrewd, observant man within the limits imposed upon him by his system. It is the technical and economic prison we need to break, and not the man.

Of course, apart from the unnecessary sentiment evoked by the word "peasant," the authors are not as alone as they imagine in seeing the advantage of small farm proprietorship as a system. It could develop far more rapidly and effectively than our present system into a structure of true co-operative marketing and processing schemes, collaboration in the use of machines and drying plants, demonstration farms, and even, if that proved beneficial, some collective handling of dairy herds or collective growing of fodder crops. It is basically a far more flexible system, and those agricultural economists who are not terrified at the words "co-operation" and "collectivisation" (there are, I think, few of them left today) realise that a system of small peasant proprietorship is useful simply because it can adapt itself to a score of new experimental forms of self-organisation. What worries me is that I feel the authors have risked spoiling a very good general thesis.—F. Le G. C.

## Insurance and Food Poisoning

In view of the recent outbreaks of food poisoning and the fact that many of the claims made by third parties under the general heading of bodily injury arise from the consumption of, or contact with, deleterious substances, a recent contribution by the Insurance Correspondent of *The Financial Times* will be of interest.

Because of the different degrees of risk involved, it is not practicable for insurers automatically to make public liability policies cover poisoning contingencies, and the ordinary standard policy excludes claims arising from such causes.

Nevertheless, the poisoning risk can be included; usually some extra premium is required for this extension of the third party policy.

Most firms have some need of insurance in respect of poisoning liability, although in many cases the risk is a comparatively remote one. Obviously, all those firms who manufacture, distribute, or supply any type of food or drink require insurance, and so do hotels and other catering establishments. The possibility of poisoning or illness is not confined to foodstuffs and drinks in their ordinary sense; it is present in many other products which are consumed by human beings or even by animals.

Products prepared for medicinal purposes, whether they be in the form of liquid or solid, and many other medicaments may give rise to claims for personal injuries.

Those claims which do arise are not always such as would come within the scope of the general public liability policy, even where such policy has been extended to include poisoning. More frequently they may arise from the consumption or use of products of a firm, and would fall under the heading of products liability insurance.

Even where a firm's products appear to involve no possible risk of poisoning or similar harmful effects, it is probable that the firm provides a canteen or other refreshment for its employees. Usually these canteens are not used exclusively by employees, and occasionally visitors are admitted.

Similarly, the serving of light refreshment in the firm's premises would include the offering of such refreshment to visitors. When social events are organised, quite a number of visitors may make use of the canteen or other catering facilities. From a technical standpoint, even the employee may use the canteen not strictly during employment. In the event of poisoning or similar injury, he may stand in the same position as a member of the public in relation to his firm. This would depend upon whether the injuries arose out of and in the course of employment, and might present a fine legal point.

For this reason, it is usual now for all firms to have their public liability and products liability policies extended to include claims for damages arising out of the consumption of deleterious matter in food or drink, and frequently from other causes coming under the heading of poisoning.

However remote the risk may be, if an accident of this kind should occur the results may well be serious. Accordingly a substantial indemnity is necessary under the extension of the insurances. As it is usual today for firms to carry large indemnities under general liability policies, probably the limit so employed would be sufficient for the poisoning extension so far as it applies to injuries to any one person.

The poisoning extension of liability policies is treated specially by insurers for limit purposes as it is realised that two or more persons may be injured through the same cause and more or less at the same time.

A faulty batch or parcel of food may have serious consequences for all those to whom it is served. Because of this, it is necessary to impose an aggregate limit to the indemnity provided under the poisoning extension. This may apply to all claims occurring in any one year, or to any series of claims arising out of one event.

# Processing Vegetables in the U.S.A.

**Part II**

**This second and final instalment of the series on Case Study Data on productivity and factory performance in American vegetable processing factories deals with pea canning from the points of view of production practices and the equipment used.**

THE following information on pea canning is stated in terms of unit man-hour requirements in selected operations and presents a partial description of processing operations. No attempt is made to describe any operation completely. The purpose is to give a cross sectional view of production practices and machinery in a limited number of American canneries. The direct unit man-hour requirements for six key operations are shown in Table 3.

Can sizes used in the U.S.A. are shown in Table 4.

#### Receiving and Preparation

The preliminary preparation of the vegetable for filling into the can includes such steps as washing, cleaning, sorting, grading, trimming, peeling, pulping, and blanching.

The man-hours expended in this operation vary considerably among canneries owing mainly to the character of the product being processed. Pea processing is highly mechanised and requires a minimum amount of hand labour.

*Plant E.*—A gooseneck elevator carries the peas from the hopper to a flotation washer which removes stones and particles from the peas. They are then pumped to a size grader and graded in sizes from one to six. As the peas drop through the grader they fall into hopper trucks which are pushed to a gooseneck conveyor. The peas are discharged into the conveyor which carries them to another washer for removal of any thistles that may be mixed with them. The peas then are flumed to a washer elevator which discharges them into the blancher, and from which they are passed to a shaker screen and on to picking tables where they are inspected visually.

Any imperfect peas or extraneous material are removed manually. The peas are then flumed to a quality grader which separates the young tender peas from the more mature ones. The peas are flumed to another shaker screen and into hopper trucks which discharge the peas to the filling machine.

*Plants F, G, and I.*—A bucket conveyor moves the peas from the hopper to a green pea cleaning machine which removes leaves, vines, and bulk from the peas by a blast of dry air. The peas then pass to a flotation washer which separates any stones that may be mixed in with the peas.

#### Filling

The variations in unit man-hour requirements are attributable to the operating characteristics of the filling machines, the nature of the product, and the technique by which vegetables are filled into the cans. Clean, empty cans are brought to the filling machine by a conveyor; the filled cans are carried away automatically to the next operations.

*Plants E, F, G, and I.*—In these plants, cans are filled with peas from multipocket, mechanical filling machines capable of maintaining accurate fills at a high rate of speed.

#### Sealing

The filled can is conveyed immediately to an automatic closing machine which double-seams the lid to the can to form an airtight container. The variations in unit man-hour requirements for this operation are accounted for partially by differences in the capacity of the sealing machines and the size of the can being sealed.

*Plant E.*—The cans of peas move to the closing machine on a belt. As the cans are sealed, they are loaded by a hydraulic crate loader into retort crates which are pushed on dollies to the retort area.

*Plant F.*—After the cans have been filled with peas and brined,

TABLE 3

DIRECT MAN-HOUR REQUIREMENTS PER DOZEN CANS IN FIVE SELECTED PEA PROCESSING PLANTS, BY KEY OPERATION, U.S.A., 1951

| Plant | Product | Operation | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Receiving* | *Preparation* | *Filling* | *Sealing* | *Thermal processing* | *Labelling and casing* |
| E | Sweet peas; U.S. grades A, B, C; sieve sizes 1-6; No. 303 can .. .. .. | 0·000 | 0·022 | —[1] | 0·016 | 0·011 | 0·007 |
| F | Early June peas; U.S. grades A, B, C; sieve size 1-6; No. 303 can .. .. .. | 0·006 | 0·025 | —[1] | 0·022 | 0·013 | 0·016 |
| G | Early June peas; U.S. grades A, B, C; sieve size 1-5 .. .. | 0·007 | 0·032 | 0·002 | 0·004 | 0·015 | 0·016[2] |
| H | Alaska peas, sieve size 3, No. 303 can .. | —[3] | 0·078 | —[4] | —[4] | 0·032 | 0·005[2] |
| I | Peas, U.S. grade C, No. 303 can .. .. | —[3] | 0·153[5] | —[1] | 0·034 | 0·044 | 0·044[2] |

[1] Included in sealing.
[2] Does not include labelling time.
[3] Included in preparation.
[4] Included in thermal processing.
[5] Includes vining time.

Abstract of Case Study Data on Productivity and Factory Performance, by E. L. Herbert, Division of Productivity and Technological Developments, Bureau of Labour Statistics, U.S. Department of Labour.

**Can labelling equipment in an American factory.**

the cans are transported on chain conveyors to clinching machines which attach the lids to the cans but do not seal them airtight. The cans then enter the closing machine where they are subjected to a partial vacuum, and the lids are sealed on to make an airtight container. The sealed cans are loaded mechanically into retort crates which are pushed to the retorts.

*Plant G.*—After filling, the cans are moved on a revolving table to a guided can conveyor and into the sealing machine. The sealed cans are deposited manually in retort crates placed next to the sealing machine. The crates are lifted from the side of the sealing machine by a hoist on to a monorail which conveys the retort crates directly to the retorts.

*Plant H.*—The sealed cans are loaded manually into the retort crates which are conveyed to the retorts by an overhead electric tram rail hoist.

*Plant I.*—As the cans are sealed they are placed manually in retort crates, which are pushed to the retorts on three-wheeled dollies.

TABLE 4

DATA ON CANS COMMONLY USED IN CANNING VEGETABLES
(NATIONAL CANNERS' ASSOCIATION)

| *Can name*[1] ... | *Dimensions*[2] | *Capacity ounces* | *Number per case* |
|---|---|---|---|
| 6Z .. .. .. | 202 × 308 | 6·08 | 48 |
| 8Z Short .. .. | 211 × 300 | 7·93 | 48 |
| 8Z Tall .. .. | 211 × 304 | 8·68 | 48 |
| No. 1 (Picnic) . | 211 × 400 | 10·94 | 48 |
| No. 211 Cylinder .. | 211 × 414 | 13·56 | 48 |
| No. 300 .. .. | 300 × 407 | 15·22 | 48 |
| No. 300 Cylinder .. | 300 × 509 | 19·4 | 48 |
| No. 1 Tall .. .. | 301 × 411 | 16·70 | 48 |
| No. 303 .. .. | 303 × 406 | 16·88 | 24 |
| No. 303 Cylinder .. | 303 × 509 | 21·86 | 24 |
| No. 2 Vacuum .. | 307 × 306 | 14·71 | 24 |
| No. 2 .. .. | 307 × 409 | 20·55 | 24 |
| Jumbo .. .. | 307 × 510 | 25·8 | 24 |
| No. 2 Cylinder .. | 307 × 512 | 26·4 | 24 |
| No. 2-1/2 .. .. | 401 × 411 | 29·79 | 24 |
| No. 3 Vacuum .. | 404 × 307 | 23·9 | 12 |
| No. 3 Cylinder .. | 404 × 700 | 51·7 | 12 |
| No. 10 .. .. | 603 × 700 | 109·43 | 6 |

[1] Names used by Committee on Simplification of Containers.
[2] The can size designation used in the industry is derived from the nominal dimensions. The first digit represents inches, the next two the extra fraction expressed as sixteenths of an inch. The diameter is cited first, followed by the height.
[3] Total capacity in avoirdupois ounces of water at 68°F.

**Thermal Processing**

The sterilising or thermal processing operation varies with each vegetable, its duration depending upon the processing temperature; the higher the temperature the shorter the processing time.

Direct unit man-hour requirements are also influenced considerably by the size of the can being processed and by the method of cooling. Some canneries cool the cans by admitting cold water into the retort whereas other canneries remove the metal retort crates from the retort and immerse them in a tank of cold water.

Another method of water cooling is to remove the retort crate from the retort and mechanically convey the crate through a canal of cold water. The cans are cooled to a temperature of about 100°F. so that enough heat remains to dry the can and prevent rusting.

Thermal processing data as reported by five canneries are presented in Table 5.

*Plant E.*—Crates containing the cans of product to be thermal processed are lifted from the dollies by a hoist and lowered into the retort. The retort lid is bolted down and live steam is admitted to the retort. The cans are heat processed for 34 minutes at a temperature of 240°F. Then the crate is removed from the retort by a hoist and conveyed through the cooling canal on a tram rail.

*Plant F.*—A hoist places the retort crates in the retort where the cans of peas are heat processed for 40 minutes at a temperature of 245°F. The retort crates are then hoisted out of the retort and placed

on a monorail conveyor extending the length of the cooling canal. This conveyor is set at a slight angle so that the retort crate moves gradually through the canal of water by force of gravity. To speed the movement of the crate through the canal, the crate is also pulled along.

*Plant G.* The retort crates are lowered into the retort by a hoist on an overhead monorail crane. The cans of peas are thermal processed for 35 minutes at 240°F. The retort is then flooded with cold water to arrest cooling. When the cans are sufficiently cooled, the crates are hoisted from the retort and placed on a dolly.

*Plant H.*—The crates are placed in the retort by a hoist. The cans are processed by live steam for 30 to 35 minutes at 240°F., and are then cooled to a temperature of from 100° to 110°F. by flooding the retort with cold water for 15 minutes. An electric hoist removes the crates from the retort.

*Plant I.*—This plant has two batteries of retorts. One consists of a group of retorts arranged in a circle and serviced by an overhead boom-type steam hoist. The other battery consists of retorts set up in a straight line, and serviced by a monorail electric hoist. Retort crates are removed from the dollies by one of the hoists and lowered into the retort. The cans are heat processed for 40 minutes at a temperature of 240°F.

At the end of 40 minutes the crate of cans is removed from the retort by a hoist and hooked on to a trolly which takes them through the cooling canal and into the warehouse. The cans remain in the cooling canal for about 35 minutes to reduce the temperature of the product to approximately 110°F.

**Labelling and Casing**

The details of the labelling and casing operations vary among canneries and directly influence the level of unit man-hour requirements. Some canneries merely case the unlabelled cans of the product and store them in the warehouse until the peak of the canning season has passed. Other canneries label and case the cans immediately after cooling.

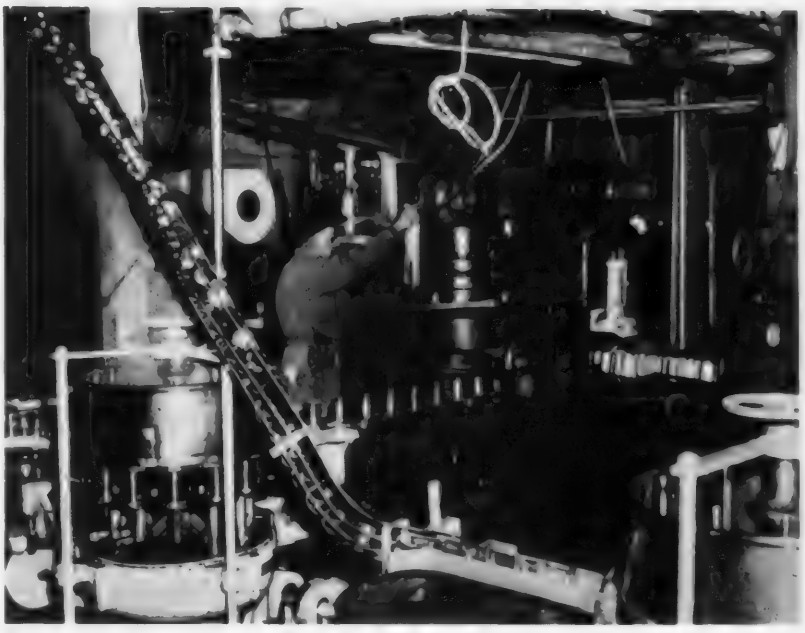
In some canneries the cans are labelled automatically and cased by automatic machines into cartons which are then glued and sealed by machine and conveyed to storage by lift trucks or mechanical conveyors.

Other canneries label the cans automatically and there the mechanisation ceases. The cans are cased by hand and the cartons are glued and sealed manually. However, the cartons are always conveyed to storage by some type of mechanical device.

*Plant E.*—After passing through the cooling canal, the crates are hoisted to a set of tram rails which carry the crates to a hydraulic crate unloader. The cans enter a guided can conveyor belt and are moved to the labelling machine. After labelling, the cans enter a casing machine and are packed into corrugated cardboard cartons. The unsealed cartons move by belt conveyor to a gluing and compressing machine which glues and seals the carton. The cartons are loaded on pallets and moved to storage.

*Plant F.*—The crates are hoisted from the cooling canal and dumped on to unscramblers—automatic machines which discharge the cans in an upright position on a conveyor belt. The cans are thus moved to the warehouse where they are cased without labelling. The boxes of peas are loaded on cardboard skids and stacked in warehouse by a fork truck. Very few cans are labelled during the packing season. Most of the labelling is done in the off-season. The cans cased during the packing season are dumped into the unscrambler which feeds them to a labeller cable line. The cans are labelled by machine. From the labeller, the cans roll down a gravity track to the boxing machine. The sealed cartons

(Continued on page 483)



**The operative places a carton of can tops in the sealing machine.**

TABLE 5

THERMAL PROCESSING DATA FOR FIVE SELECTED PEA PROCESSING PLANTS, BY PRODUCT, U.S.A., 1951

| *Plant* | *Product* | *Pressure pounds per square inch* | *Process temperature degrees F.* | *Process time (in minutes)* | *Method of cooling* |
|---|---|---|---|---|---|
| E | Peas, No. 303 can | 10-13 | 240 | 34 | Cooling canal |
| F | Peas, No. 303 can | —[1] | 245 | 40 | Cooling canal |
| G | Peas, No. 303 can | 13-14 | 240 | 35 | Retort is flooded with cold water |
| H | Peas, No. 303 can | 10-12 | 240 | 30-35 | Retort is flooded with cold water |
| I | Peas, No. 303 can | 12 | 240 | 40 | Cooling canal |

[1] Information not available.

# The Rheology of Foods

A MONOGRAPH* devoted to the rheology of foodstuffs is a welcome addition to the series on the Rheological Behaviour of Natural and Synthetic Products.

In effect this book is, in itself, a collection of monographs: "Starch" by J. Hofstee and A. H. A. de Willigen; "Cereals" by D. H. Greup and H. M. R. Hintzer; "Milk, Cream, and Ice cream "by G. W. Scott Blair; "Butter" by H. Mulder; "Cheese" by M. Baron and G. W. Scott Blair; "Honey" by J. Pryce-Jones together with a section on miscellaneous foods (syrups, gels, fondants, chocolate, etc.) by H. G. Harvey; and "Psycho-rheology" by R. Harper. The volume is well-documented, with a bibliography of some 500 references to original literature. Much of the material in the section on miscellaneous food products is the work of the British Food Manufacturing Industries Research Association and brings together conveniently in one place much information otherwise inaccessible.

No task appears to the reviewer to be more difficult than to assess the rheological properties of variable natural products, such as butter, honey, and cheese, yet it is quite apparent that there is a wealth of quantitative information correlating the tactile properties with chemical composition and with other physical attributes. These data are set out in a very clear and succinct fashion yet without omission of relevant detail.

The serious student of foodstuffs will find much food for thought and many stimulating ideas in its pages. He will also add to his vocabulary such words as "sectility," for the "cuttability" of cheese curd, which when duly ripened may show both "lainures" and "yeux."

One of the more surprising sections is that by Dr. Harper on psycho-rheology; it is high time that some attention was paid to the tactile qualities of foodstuffs. It must have been frequently observed that the acceptance by consumers, especially children, of new spreads and the like, depends largely on the "feel" on the tongue, and that even when flavour and sweetness are satisfactory, a bad tactile impression will cause rejection. This very natural human response has been neglected in the past and it is good to see that some advance is being made towards its quantitative evaluation.

In general and in particular, this book is to be recommended as probably the only adequate full length treatment of its subject. Very few errors have been detected —although the reviewer must confess to being allergic to the use of "$2\frac{1}{2}$ times greater than" when "$2\frac{1}{2}$ times as great as" is meant; the former represents a ratio of $3\frac{1}{2}$ : 1 and the latter $2\frac{1}{2}$ : 1 and in a work of mathematical tendencies the former usage should be banned. However, this is only a trifling criticism and in no way detracts from the value of the monograph.—G. M. D.

* *Foodstuffs: Their Plasticity, Fluidity, and Consistency*. Edited by G. W. Scott Blair. Pp. 256+xv. North-Holland Publishing Co. Price f.25.

# Hygiene in the Food Store

NATURE is fundamentally very prodigal with her distribution of food supplies; consequently there is always the tendency with scattered populations or uncivilised peoples to eat their food fresh and to give anything that is left over to farm animals or to scavengers, of which the dog is a typical example. In countries such as Ceylon, it is still the custom to eat food from a plantain leaf and then to give both the remainder of the food and the leaf to cattle, but the position is very different in highly populated and industrialised countries, where most of the food is imported, and where it has to be eaten from china or glass with cutlery, which has been employed by countless others, and where it is often stored under conditions which are favourable to the multiplication of pathogenic micro-organisms.

Dr. Clunie Harvey and Mr. Perry have written a very readable little book* on food hygiene primarily as it affects the sale and handling of food on the small scale rather than from the manufacturing standpoint and, as such, it is to be welcomed. The authors stress the point of view that "charity begins at home," and that while large scale cases of food poisoning are often publicised, these are more easily detected than are minor outbreaks in the household. It is therefore as essential to adopt hygienic practices in the home or in the small food store as it is in the large food factory. Indeed, hygiene may be more important in the small establishment than in the large one for the simple reason that there is far less chance of subsequent sterilisation.

There are many wise statements in this little volume; an example comes from the Foreword by Sir William Savage, who says that "the good health administrator likes to have adequate powers on the Statute Book, and they are essential to his work, but equally his ideal is rarely to need to use them. A record of numerous prosecutions is to him a sign of something wrong with his methods."

This book is one which should prove of use to students of hygiene and serve as a guide to workers in food factories to encourage them to take a serious interest in the products they are manufacturing.—T. McL.

* *Food Hygiene Handbook*. By W. Clunie Harvey, M.D., D.P.H., F.R.San.I., and H. A. Perry, F.R.San.I., M.S.I.A. Pp. 159+x. Heywood and Co. Price 15s.

**FUTURE ARTICLES**

AMONG the articles to be published in forthcoming issues of FOOD MANUFACTURE are the following: "An Irish Food Factory," "Potted Shrimps," "Recent Advances in Protein Nutrition."

# The Latin-American Fishery Industry

THE problems of economic development of fisheries in Latin America are the subject of a recent FAO study entitled "Present Status and Prospectives of the Fishery Industry in Latin America."

It is stated in the report that Latin America as a whole has shown steady progress in the development of its fisheries since the end of World War II, and in certain restricted areas in Chile, Brazil, Peru, Venezuela, and Mexico, there are already the nuclei of large fisheries industries, including secondary processing industries like freezing and canning.

Because of its high cost, it is felt that large scale mechanisation should not take place in Latin America before mass demand has been secured. Nevertheless, sound policies of small scale mechanisation on the basis of existing types of craft and gear, particularly when combined with social and credit schemes for the benefit of small producers in the region, can result in a substantial raising of labour productivity. Co-operatives have proved very effective in this respect in Brazil, Mexico, British Guiana, and certain Caribbean countries. The Brazilian law, for example, requires that fishermen belong to societies which must have a minimum of 150 members. These societies levy a 3 per cent. tax on the catch, out of which certain services are provided. These include education, medical care, and loans for financing the purchase of boats and gear.

Advanced methods of fish processing have comparatively minor importance in the economy of the industry except in a few industrial centres in Chile, Mexico, Peru, and Venezuela. A freezing industry has developed in Mexico and Peru largely because of a steady demand for shrimp, tuna, and tuna-like products in the U.S. market, but in Mexico, where almost all frozen shrimp is exported to the U.S., the plants do not normally work at full capacity owing to lack of raw material, although the resources could be subjected to more intensive exploitation.

In Peru, where vessels with refrigeration facilities and shore-freezing plants can freeze 460 metric tons and store 6,600 metric tons of fish a day, the domestic consumption is only about 200 metric tons a year. Total annual landings were 105,550 metric tons in 1951. Ten per cent. of this was frozen, almost all of it for export, and even this represents a figure very much below the capacity to freeze.

Curing is the most important form of fish processing in Latin America, sales of cured fish being second only to those of fresh fish on the domestic markets. In general, except in Argentina, Chile, and Peru, the technological methods are primitive, and the product low-grade.

Canning is one of the most industrialised sectors of the fishing industry in the whole region, but particularly in Argentina, Brazil, Chile, Mexico, Peru, and Venezuela where, since the war, local products have been competing successfully with foreign ones. Mexico, Peru, and Venezuela have even succeeded in entering the international trade in canned fish products which before the war was monopolised by such traditional world suppliers as Norway, Portugal, Spain, Japan, and the U.S.A. But again, as in the case of frozen fish, effective production in 1951 in Peru was rather less than 17 per cent. of the capacity of the present industrial set-up.

Internationally recognised quality standards for the product and the can must be established and a cheaper and more reliable supply of tinplate must be found before possible domestic and foreign markets can be fully exploited.

Food production in Latin America has not kept up with population growth since the war, but the increase in fisheries production has been well ahead of the birth rate. The value of the increase is, however, lessened by the fact that it is so very unevenly spread geographically. Chile, Southern Brazil, Peru, Venezuela, and Mexico contribute more than 80 per cent. of the total landing in the region, while 15 other countries with analogous marine resources contribute less than 20 per cent.

Among the many factors which are hampering the growth of fisheries production in these underdeveloped areas, the limitations imposed by the peculiar economic and social structure predominate. Lack of reasonable marketing organisation and an efficient transport system to handle perishable foodstuffs, high costs of distribution, and deficiency in purchasing power in the lower income brackets of the population undoubtedly are the main reasons for the low levels of productivity observed.

Governments and the fishing industry, realising that expanded domestic market outlets are needed for national economic development of fisheries, are taking steps to build up such outlets.

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## Processing Vegetables in the U.S.A.

(*Continued from page 481*)

are loaded on pallets which are moved to storage by a fork lift truck.

If any labelling should be necessary during the packing season, the labelling machine is introduced into the line just before the boxer machine.

*Plant G.*—The unit man-hour requirements as shown in Table 3 are for casing only. The retort crates are taken to the warehouse and dumped on the unscrambler. The unlabelled cans are cased by an automatic caser and placed in storage. When a sale of canned goods is made, the cartons are removed from storage, the cans are removed from the carton, labelled with the purchaser's label, and repacked into the cartons.

*Plant H.*—After cooling, the cans of peas are stored in the warehouse to be graded and labelled at a later date. The reported unit man-hour requirements of this plant do not include labelling time for the reported production.

*Plant I.*—The reported unit man-hour requirements do not include labelling time. As the crates come from the cooling tank, they are conveyed to the warehouse where the cans are hand-packed into cartons and transported to storage by a hand-operated hydraulic lift truck. The cartons are stacked by a case stacker.

## The Refrigerated Gas Storage of Bananas

PILOT plant experiments carried out in Jamaica on banana storage are described in a recent publication.*

Half the bananas imported into the United Kingdom since the war have come from Jamaica, most of the fruit being of the *Gros Michel* variety, which is susceptible to attack by Leaf Spot disease. One of the results of the disease is that the bunches of fruit produced by infected plants are small in size so that they appear to be less mature than they really are. When bunches of these fruit are included in a cargo they tend to start ripening during the voyage and to encourage, by the production of ethylene, the premature ripening of the rest of the cargo.

Experiments carried out on a laboratory scale in Trinidad before the war indicated that the use of refrigerated gas storage during the journey from the West Indies to Great Britain might prevent this. In the post-war experiments, each experimental storage period was from 12 to 18 days, the former being about the time the bananas normally take on the voyage to Britain. The control of carbon dioxide and oxygen was effected by restricted ventilation, the simplest and most practicable method in large scale storage.

During the first series of experiments, the rate of carbon dioxide production began to rise at once, showing that gas storage conditions encouraged ripening to begin; but the conditions also retarded the completion of the ripening process to such an extent that after the "voyage period" it was found impossible to ripen gas-stored bananas to good quality. It was concluded that when no means of removing any accumulation of ethylene is provided, most of the fruit starts to ripen almost at once under the conditions of the restricted ventilation used for gas storage.

A new series of experiments to determine whether the concentration of ethylene could be reduced by introducing low concentrations of ozone showed that ozone would have this effect without injuring the fruit. By the use of ozone it was found possible to hold fruit stowed as cargo for 20 days before the onset of ripening. After treatment with ethylene, the fruit then ripened normally.

The best conditions for gas storage are not yet known and further work on a pilot scale is necessary before the use of ozone in refrigerated gas storage or refrigerated air storage can be seriously considered. Ozone is an additional variable and if the concentration is too high the fruit can be harmed; if it is too low ripening is not stopped.

Doubts about the extent and effects of Leaf Spot infection still exist. There probably was some infection of the fruit but it will be necessary to carry out further work on gas storage with infection-free fruit or to find methods of diagnosing the effects of slight Leaf Spot infection.

* *The Refrigerated Gas Storage of Gros Michel Bananas.* By R. Gane, M.A., M.Sc., Ph.D., A.R.I.C., C. R. Furlong, B.Sc., A.R.C.S., J. E. Robinson, and H. J. Shepherd. Technical Paper No. 3. Pp. 46+v. Published for the D.S.I.R. by H.M.S.O. Price 2s. net.

## In Praise of the Chemist

FOUR articles by leading scientists, originally delivered as lectures under the auspices of the Chemical Council in the Festival of Britain year, have now been reprinted, with minor amendments, in book form.*

In his contribution, Sir Cyril Hinshelwood traces the development of man's knowledge of the ultimate particles of which gross matter is composed, and introduces the reader to a comprehension of some of the more philosophic aspects of chemical science and their influence on thought and behaviour.

How the enormous industrial development during the past 100 years has to a great extent been based on, and made possible by, the chemist's ability to bring about and control transformation of matter, and to build up complex molecular structures of planned design is illustrated by Prof. R. P. Linstead's lecture.

Chemistry and food is the subject of the contribution by the late Sir Jack Drummond, who played a notable part in the investigation of human nutrition and of the factors involved in the maintenance of health. His paper deals with the work of chemists in elucidating the chemical nature and constitution of vitamins, and in the production of synthetic vitamins so that it is now possible to enrich foods, when desired, with the necessary vitamins in definite and controlled amounts.

The story of the work of chemists in the conquest of disease is told by Prof. J. W. Cook. Through their investigation of the hormones secreted by the ductless glands and, in some cases, through the synthetic production of these, chemists have made a contribution of inestimable value to the maintenance of health and the prevention of disease.

Each of the four contributions lays stress on the general ideas implied in the advances in each of the fields, and the whole provides a useful source of reference for the scientist, giving him a picture of what is being done in fields perhaps not immediately his own, and also encouraging and informative reading for the layman.

* *Chemistry and Man.* By Prof. Sir Cyril Hinshelwood, F.R.S., Prof. R. P. Linstead, C.B.E., F.R.S., the late Sir Jack Drummond, F.R.S., and Prof. J. W. Cook, D.Sc., F.R.S. Pp. 88+viii. Spon. Price 7s. 6d.


**The Leonard Hill Technical Group**

***Articles published in some of our associate journals in the Leonard Hill Technical Group this month include:***

**Manufacturing Chemist.**— Ampholytic Detergents; Redox Indicators.

**Chemical & Process Engineering.**—Recent Advances in Milk Processing Plant; Ultrasonics in Industry.

**World Crops.**—The Work of the Port of London; Agricultural Planning in East Africa.

# Abstracts from Recent Food Literature

**Spray Dried Buttermilk.** T. I. Hedrick (*Milk Plant Monthly*, 1953, **42**, 19).—A review of spray dried buttermilk, including its types, properties, methods of production, nutritional value, and uses in food products.

**Susceptibility of the Starch in Fresh and Stale Bread to Enzymatic Digestion.** S. S. Jackel, A. S. Schultz, and W. E. Schaeder (*Science*, 1953, **118**, 18).—Data is given concerned with the nature of the starch changes accompanying the staling of bread which indicate that the rate of *in vitro* digestibility of stale bread by pancreatin is significantly less than that of fresh bread. Bread baked with bacterial α-amylase maintained an essentially constant rate of digestibility, equivalent to that of fresh bread throughout the storage period. Evaluation of the significance of these *in vitro* findings in terms of human nutrition will not be possible until suitable *in vivo* studies are carried out.

**Protein Amino Acids.—Contents of Vegetable Leaf Proteins.** E. G. Kelley and R. R. Baum (*Agr. and Food Chem.*, 1953, **1**, 680).—A number of vegetable leaf meals and protein concentrates are analysed for 10 amino acids. No leaf meal is outstandingly high in any one amino acid, but all contain a nutritionally well-balanced mixture. The content of each leaf meal is approximately 25 per cent. lower than that of the corresponding concentrate. This is attributed to failure of the factor Kjeldahl nitrogen × 6·25 to estimate correctly the protein in leaf meals.

**Evaporative Cooling of Fruits and Vegetables.** D. H. Dewey (*Refrig. Engg.*, 1952, **60**, 1281).—Cooling by evaporation of water is adapted only to those commodities, such as lettuce, which can lose moisture quickly and which offer a large exposed surface in proportion to volume or mass to be cooled. Potatoes were not satisfactorily cooled by evaporation of water, for they offer little surface, a large mass, and the intercellular spaces in the tissue are not continuous and prevent distillation of water vapour from the interior of the tuber. Apples also cooled slowly and suffered desiccation at lenticels and calyx. Broccoli and sweet corn were adequately cooled, but at rates slower than lettuce. Weight losses occurring during vacuum cooling ranged from 1·9 to 4·8 per cent. of the initial fresh weights of the fruits and vegetables tested. A physical limitation to vacuum cooling, other than the adaptation of the commodity to the process is the high vacuum of 29·74 in. Hg necessary to evaporate water at 32°F. The capacity of the steam ejectors or pumps must be great enough to remove the large amount of water vapour as it evaporates. At 32°F., 1 lb. of saturated water vapour has a volume of 3,300 cu. ft.

**Colour Grading by Electronics.** N. W. Derosier, F. W. Billerbeck, and T. J. Smith. (*Food Engg.*, 1953, **25**, 52).—New instruments are described for the colour evaluation of apples and tomatoes.

**Chemical Aspects of Dried Fruits.** P. H. Richert (*Agr. and Food Chem.*, 1953, **1**, 610).—Recent work on dried fruits has dealt largely with improving the acceptability, stability, and utilisation of dried fruit. The nature of the browning reaction in dried fruits and the role of enzymes and storage temperature have been evaluated. Dried fruits, like many other established food products, must be presented to the customer in new forms to compete successfully in the retail market.

**Russian Method of Rapid Bacon Curing by Means of Arterial Injection.** D. Pavlov (*Miasnaia Industria*, reported in *La Revue de la Conserve de France et de l'Union Française*, 1953, **9**, 88).—Experiments at the Veterinary Academy, Moscow, have led to the discovery of an intravascular curing method, consisting of the injection of the brine into the natural blood circulation system of the carcass, which must therefore be dissected without damaging the main blood vessels. This can be done by the insertion of wooden pins. After 18 to 24 hours of cold storage, a brine of given quantity and composition is injected into the artery; this is followed by six days of tank curing and three days of maturation. The method is stated to cause a better absorption and more uniform distribution of the brine. Moreover, the whole curing process is reduced to 15 to 20 days.

**Separating Cocoa Shell and Nib Particles by the Separostat Process** (*Gordian*, 1953, **1268**, 18).—The present mechanical system of separating nibs and particles of shells from roasted and crushed cocoa beans involves considerable waste. A new German invention by Johann Toth is based on the observation that nib and shell particles react differently in an electrostatic field. This discovery has led to the development of a new machine, known as the "Separostat," which is suitable for the large scale separation of cocoa nib and shell. It consists of a processing part, in which the cocoa beans are pre-winnowed, and the separating plant proper. The material passing through the latter is subjected to electrostatic power, with the result that nibs and shells are separated and drop out through different outlets. Fitted with centralised control which also permits the regulation of the degree of separation, the machine is one-man operated and can deal with up to 160 kg. per hour with a current consumption of no more than 1 kW.

**Fat Spoilage Problems.** R. Marcuse and G. Borgström (*Fette und Seifen*, 1953, **8**, 515).—Condensed report on a symposium of Scandinavian food research workers, convoked by the Swedish Institute for Food Preservation in September, 1952. The two sections of the transactions were concerned with the latest scientific developments in the sphere of fat spoilage, and practical measures to combat waste. Among the problems dealt with in the first part were autoxidative and hydrolytic rancidity, flavour reversion, the acidic composition of fats, surface chemistry, pro-oxidants and antioxidants, and interdependence of rancidity and metabolic processes. In the second section, it was

agreed that there was a need for simpler and more reliable test methods, clearer definitions of the term rancidity, the development of methods to predict the inclination of fat towards rancidity, and of methods to determine the presence of pro-oxidative metal ions.

**Detection of Polymerised Fish Oil.** E. Hugel (*Fette und Seifen*, 1953, **8**, 544).—A recent German prohibition on the use of polymerised fish oils for food manufacture has emphasised the need for a practical, yet reasonably accurate detection method which will also permit a clear distinction between polymerised oil and normal deodorised fish oil. A method, based on one devised by F. Jakobsen, is described which is confined to the simple test whether or not the oil sample is wholly soluble in propyl alcohol at a temperature between 5° and 20°C. The presence of polymerised oil is thereby revealed through the presence of insoluble glycerides.

**Summary Survey of Fat and Water Contents in the Edible Portion of the Herring.** C. H. Brandes and R. Dietrich (*Fette und Seifen*, 1953, **8**, 533).—There is still considerable discrepancy in the published data concerning the chemical composition of herring, partly because of the influence of biological and geographical factors, and partly because of certain shortcomings of existing analytical methods which are reviewed. The authors have detected a correlation between the water contents and fat contents of the edible portions of herring, which shows a high degree of consistency. This correlation permits the determination of the fat contents on the basis of the much easier and quicker determination of the water contents, so that the time for the analytical test can be reduced from 10 to three hours.

**New Processes for Mushroom Cultivation** (*La Revue de la Conserve de France et de l'Union Française*, 1953, **9**, 40).—In France, mushrooms are traditionally grown in specially prepared manure beds, mainly in disused quarries. This method is expensive, and it is recommended to adopt the method, already well known in England and U.S.A., of mushroom growing in portable boxes, which is more economical in space and labour. It is also recommended to resort to manure pasteurisation so that the fermentation can be controlled and noxious bacteria eliminated, and to substitute, as far as possible, mechanical handling for the manual handling of manure. Research on these lines is carried out by the Mushroom Testing Station at Saint-Cyr, which is also concerned with the testing of suitable manures.

**Use of Ozone in Cold Storage of Fruits.** J. Kuprianöff (*Kältetechnik*, 1953, **10**, 283).—Ozone is used occasionally for cold storage of fruits, but little has been published about the success of this method. The oxidising property of ozone has a strong microbicidal effect, but may also affect the goods and human beings. To obtain the desired effect, the ozone laden air must have forced ventilation, and the fruit must not be too tightly stored. An important incidental effect of the ozone is the prevention of mould. In spite of its own typical odour, ozone has a deodorising effect which is, however, apparently confined to oxidisable sources of odour. The aroma of aromatic fruits (*e.g.* strawberries) is reinforced. Cost of operation is low, and an ozonisation of two to three hours a day is recommended.

**The Effects of Antibiotics on the Bacterial Plate Counts of Normal Raw Milk.** E. L. Stolz and D. J. Hankinson (*J. of Milk Food Tech.*, 1953, **16**, 157).—Concentrations of 0·01 unit of penicillin, 0·1 mg. of streptomycin, separately or combined, 0·1 μg. of aureomycin, and 0·1 mg. of tyrothricin per ml. of raw milk were sufficient markedly to reduce bacterial growth during 48 hours at 7°C.

**Judicious Use of Bactericidal Radiation in the Preserving Industry.** A. Bérard (*La Revue de la Conserve de France et de l'Union Française*, 1953, **9**, 97).—The problem of sterilisation in the preserving industry lies in the need to eliminate bacteria without harming the food organisms proper. This can be done by ultra-violet radiation of such a wavelength that the destructive effect is confined to micro-organisms. Ultra-violet radiation can therefore be used to sterilise the air of the factory premises, the water used for washing and preparation, and the surface of the product itself, as well as to sterilise the empty tins and the atmosphere in the maturation chambers of smoked, semi-smoked, cooked, or cured products.

**Flavour of Selected Vegetables Grown in Soil Treated with Isomers of Benzene Hexachloride.** E. H. Dawson, G. L. Gilpin, M. E. Kirkpatrick, and C. A. Weigel (*J. of Agric. and Food Chem.*, 1953, **1**, 399).—Studies were made to determine the effect on flavour of tomatoes, lima beans, potatoes, radishes, and carrots from use of purified alpha, beta, gamma, and delta isomers of benzene hexachloride, a mixture of these isomers, commercial gamma isomer, and lindane as insecticides in growing the vegetables. The results indicate that flavour may be affected by certain formulations of benzene hexachloride; the effect on flavour varies with the formulation, the dosage rate, and the type of vegetable grown.

**A Modification of the Babcock Test Employing a Quaternary Ammonium Compound.** H. L. Wildasin, E. O. Anderson, and D. E. Watts (*J. Dairy Sci.*, 1953, **36**, 87).—The modification of the Babcock test which has been used successfully for the butterfat estimation in homogenised milk has now been applied with equal success to the analysis of raw milk, milk preserved with $HgCl_2$, and pasteurised milk. The results obtained with this modified test were, on an average, 0·03 per cent. lower than those obtained by ether extraction methods.

**Rapid Method for the Determination of Salt in Butter.** W. Riedel (*Molkereiztg, Hildesh.*, 1952, **6**, 833).—In determining the salt content of butter by the silver nitrate titration method, the calculation is simplified if, instead of 0·1*N* $AgNO_3$, a solution of 29·0749 g. per l. is used.

**Smoke Process may Develop New Outlets for California Nut Crop.** W. V. Cruess (*Food Packer*, 1953, **34**, 26).—Research on the utilisation of almonds and walnuts.

## Synthesis of Vitamin C in the Body

AMONG other topics relating to nutrition discussed at a symposium arranged by Harvard's School of Public Health and supported by the National Vitamin Foundation was one on vitamin C. Prof. Charles C. King of Columbia and two of his staff, Drs. Helen B. Burch and Lothar L. Salomon, have examined the view held by some biochemists that the embryo guinea pigs or the human foetus can synthesise vitamin C before birth, but not afterwards. The evidence relied on is the large amount of vitamin C in embryonic guinea pigs.

Prof. King and his assistants introduced under the skin of pregnant guinea pigs glucose containing radioactive carbon atoms. After allowing sufficient time for the compound to filter through the mother's body into her offspring's circulatory system, the embryo was removed and analysed. Highly sensitive Geiger counters failed to pick up any trace of radioactive carbon, which meant that none of the vitamin C in the guinea pig embryo had come from the "tagged" glucose. The vitamin could have come only from food eaten by the parent guinea pig. It was therefore concluded that embryonic guinea pigs do not synthesise vitamin C from glucose.

Commenting on this work, Prof. King points out that there is a direct connexion between the solution of this problem and proper diet. Having discovered that young animals must get all their vitamin C as such from the mother, it is obvious that her intake is necessary to keep both parent and offspring healthy. He holds the view that a good proportion of people do not get enough vitamin C; although they may not get scurvy, they never enjoy good health and should take about ten times more of the vitamin than the amount necessary simply to prevent scurvy.

The team of workers hope soon to solve another complicated puzzle with radioactive carbon. This one concerns the fate of vitamin C in the adrenal glands when it "disappears" after an injection of ACTH hormone. In animals that have received injections of the hormone, there is a sharp drop in the amount of vitamin C in their adrenal glands.

Evidence so far available indicates that vitamin C does not break up into other compounds. The question is: where does the intact vitamin go when it leaves the adrenals? Once this question is answered, physiologists may have a better understanding of the interaction between hormones and vitamins—a still relatively unexplored subject.

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## Papain Production

PAPAIN is obtained by tapping the mature but unripe green fruits of the papaw (*Carica papaya Linn.*), a plant indigenous to tropical America.

According to *Colonial Plant and Animal Products* (**3**, 1, 1952-53) there are a number of considerations that influence the possibilities of papain production, but the price variation seems to be the most important because it is linked with a limited market and rapidity of increasing or decreasing supplies.

There appear to be five main uses in the United States, of which the brewing industry is understood to employ the largest quantities, chiefly in a process for "chill-proofing" beer. Other important applications are in medicine and pharmaceutical preparations; in the food industry, in pre-cooked foods and in the manufacture of meat tenderising preparations; and in the textile industry. It is also reported to be used in the chewing gum industry, but there is a lack of published evidence regarding this.

Ceylon is a long-established producer of papain, and has been the leading exporter, except for a few years in the 'forties. Production in British East Africa is a more recent development, Tanganyika being the chief producer, with Uganda second. With the exception of the Belgian Congo and Ponape (Caroline Islands), other countries have never produced large quantities. There has been very limited production in Thailand and Western Samoa.

There are no universally recognised grades of papain. Tanganyika producers grade it into three qualities, according to colour. In Ceylon, the three grades are: fine white (oven dried, reputed to be "prepared by a special process"); white (oven dried); dark (sun dried). Much East African papain is bought on "marks," *i.e.* on the reputation of growers who produce a good product.

The buyer looks for a creamy white granular, or crumb-structured material, free from obvious smell, and with a high proteolytic activity, assayed by methods based on protein digestion. Producers of papain of a recognised high standard are reported to be able to sell their production at prices above those ruling for ordinary good quality produce.

East African papain is packed in new, four-gallon tins, which may be coated with paraffin wax or lined with greaseproof paper, each holding 30 lb. The tins are enclosed in wooden cases. During filling, the material should not be exposed to strong light. After the tins are filled, as much air as possible is withdrawn by means of a suction pump and the tins sealed with solder. Papain is sometimes packed in inert gas.

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## Pharmaceutical Emulsions

WHILE the theory of emulsions remains what it was, numerous changes in the commercial availability of emulsifying agents are reflected in the text of a recent book* and in the table of emulgents and their manufacturers, in which nearly 400 products are listed.

In this new edition, the opportunity has been taken to provide a complete index to the text, thus increasing the usefulness of the work to students, laboratory workers, pharmacists, and workers in the pharmaceutical and cosmetic industries.

* *Pharmaceutical Emulsions and Emulsifying Agents.* By L. M. Spalton, B.Pharm., M.P.S. 2nd Edition. Pp. 138+vii. Chemist and Druggist. Price 7s. 6d.

# News from the Industry

## FORTHCOMING EVENTS

### Royal Society of Arts

Among the papers to be read during December under the auspices of the Royal Society of Arts is the following:

Dec. 9. "The Seed Crushing Industry," by E. G. Woodroofe, Ph.D., to be held at 2.30 p.m.

*

### The Chemical Society

Two meetings have been arranged by the Chemical Society for the reading of original papers. These will be held in the rooms of the Society, Burlington House, on December 3 and 17 at 7.30 p.m.

*

### The Institute of Refrigeration

A meeting of the Institute of Refrigeration will be held on December 15 at 5.30 p.m., when a paper on "Absorption Refrigeration" will be read by Dr. G. G. Haselden.

*

### Society of Chemical Industry

The Microbiology Group of the Society of Chemical Industry will hold a meeting at 6.15 p.m. on December 3, when a symposium on "Dextran" will be presented.

The Nutrition Panel of the Food Group will hold a meeting on December 9, when Dr. R. Passmore will present a paper entitled "Nutritional Reappraisals—2. Calorie Requirements and Basal Metabolism."

*

### Royal Institute of Chemistry

The London Section of the Royal Institute of Chemistry have arranged the following meetings for December:

Dec. 2. "Modern Detergency," by F. Courtney Harwood (lecture and film), to be held at 7 p.m. at the South-West Essex Technical College, Walthamstow.

Dec. 3. "Some Aspects of the Chemistry and Stereochemistry of Polycyclic Aromatic Compounds," by Prof. J. W. Cook, to be held at 8 p.m. at the Zoology Lecture Theatre, Reading University.

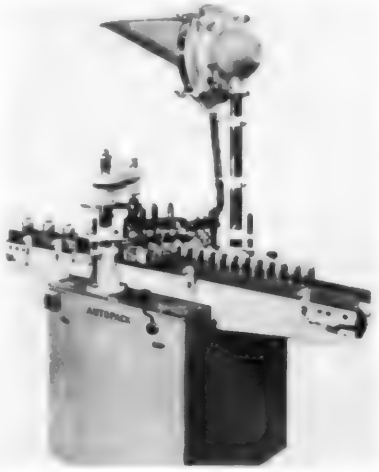
Dec. 7. "Ten Years Hence: The Promise of Chemical Technology in Great Britain," by Dr. R. F. Goldstein, to be held at 6.30 p.m. at the Chemical Society.

Dec. 8. "The Manufacture of Antibiotics," by Dr. E. Lester Smith, to be held at 6 p.m. at the Sir John Cass College, Jewry Street, London, E.C.3.

### Automatic Screw Capper

The introduction of a new fully automatic screw capping machine, designed to handle the widest possible range of metal and plastic screw caps up to a maximum diameter of 2 in., is announced by Autopack. This machine will maintain output speeds of up to 100 per minute and resetting for different sizes of container or cap can be achieved quickly and simply.

The containers are conveyor fed into an intermittently rotating motor which passes them beneath the cap-chute fed from an automatic hopper. The caps are placed into position on the containers, given one complete turn as the container passes round the machine, and then screwed down and tightened to a predetermined tension. When the operation is completed, the containers are ejected *via* the outlet conveyor.



The Autopack screw capping machine.

All working parts are fully guarded and the design of the machine makes it impossible for a container or cap to be damaged or for a jam to occur. Safety devices stop the machine automatically immediately should it become overloaded. Liquid or powder filling units can be incorporated on the machine if required.

### Plant for Welsh Tinplate Industry

A £4,000,000 order for rolling-mill equipment to be installed in South Wales has been placed jointly by Richard Thomas and Baldwins and The Steel Company of Wales, Ltd.

The contract, which goes to the Sheffield firm of Davy and United Engineering Company, is the basis of a large-scale modernisation plan for the Welsh steel and tinplate industry.

Installation of the new plant will mean that tinplate, whether for home consumption or export, will be produced by the most modern methods, with all the advantages of improved quality and lower cost.

When complete, the plant will add 9,000 tons per week of continuously produced tinplate to the present South Wales capacity.

## OBITUARY

**Mr. Hamilton Brinsley Bush,** at Colchester Hospital, on November 10.

Second son of Alfred Walter Bush and grandson of the founder, Mr. H. B. Bush joined the company of W. J. Bush and Co. in 1920. From 1931 to 1934 he was joint general manager, from 1934 to 1941 he was director, and was appointed managing director from 1941.

He was also a director of W. J. Bush and Co., Inc., U.S.A., and of W. J. Bush and Co. (Canada).

*

**Mr. P. E. Negretti,** at Droitwich on September 20. Following the first world war, Mr. Negretti devoted himself to the development and expansion of the industrial and aeronautical side of Negretti and Zambra. His latest activities included visits to South Africa in 1950, as a result of which the South African company was established on April 25, 1952.

### Standard for Winchester Bottles

In 1939, the B.S.I. issued a standard for Winchester bottles at the request of the Association of British Chemical Manufacturers and of the British Chemical Plant Manufacturers Association. Because of the war-time difficulties of supply, the standard was not widely used and a revision has now been prepared consistent with current practice. The new standard, B.S.830: 1953, 80 oz. and 90 oz. Winchester bottles, relates to plain and fluted containers, and in order to facilitate storage and outer packaging, the same maximum diameter has been adopted for both types in each capacity.

### Temperature Transmitter

Employing the force balance principle, requiring a compressed air supply of 20 p.s.i., and having a consumption of 1/6 cu. ft. per minute, the Negretti and Zambra air operated transmitter for distance indication, recording, and control of temperature incorporates a mercury-in-steel system and is suitable for temperatures up to 1,200° F.

No capillary is required between the sensitive bulb and receiving instrument, and the force balance principle needs only a maximum movement of 0·002 in. of the Bourdon tube, thus ensuring freedom from fatigue and a long, accurate life.

The sensitivity of the balance system is such that for a temperature change of ½ per cent. of the range the air leak valve remains wide open or fully closed until balance conditions are obtained, *i.e.* the correct value is transmitted in minimum time.

### Delivery and Pick-up Vans

Two additions have recently been made to the Commer range of commercial vehicles. One is an all-steel 25 cwt. forward control van of over 300 cu. ft. capacity, with flush-fitting sliding doors each side and full width hinged doors at rear. The 30 b.h.p. power unit with wear-resisting chrome bores now embodies an entirely new synchromesh gearbox and improved suspension with telescopic hydraulic dampers front and rear is provided.

The other is an entirely new light pick-up which combines the luxury of a modern saloon car with generous goods carrying capacity.

The light pick-up—one of the latest additions to the Commer range of commercial vehicles.

### Belfast's New Bakery

The United Co-operative Baking Society's new plant at Belfast was officially opened early in September by Mr. James Lang, the President. The new plant, which is the result of extensions, reorganisation, and renewal of equipment of the original Belfast bakery, has been designed to give an output of 2,500 loaves per hour.

A feature of the new plant is a modern 75 ft. travelling oven for the manufacture of the Irish batch loaf, with air-conditioned cooling, slicing, wrapping, and ancillary facilities.

### New Measuring System

After three years' research and development work in collaboration with the Research Laboratories of The General Electric Co., a new system for measuring pressures, temperatures, and mechanical movements electrically and indicating the results at a distance has been introduced by Salford Electrical Instruments.

This new system is a development of the original electro-mechanical converter system and introduces a smaller transducer with a wide range of applications. These include the direct measurement of mechanical movements of 0-20, 0-50, and 0-100 thousandths of an inch by a spring-loaded stylus, the measurement of pressures, utilising a diaphragm or other pressure/mechanical conversion device, and the measurement of any quantity which can be converted into a mechanical movement.

### To Celebrate 25 Years' Work

A total of 192 people attended the annual dinner given by the Directors of British Belting and Asbestos to the Twenty-Fivers Club on September 24.

The guests of honour at this event were those members of the staff who had been in the service of the company for 25 years or more. The total number of those who have qualified for membership has now reached the century mark.

Each year the new members are presented with gifts as a token of the company's appreciation of their long service.

### Bakery Research

Many of the enquiries received from members are dealt with in the current issue of the Bulletin issued by the British Baking Industries Research Association.

In its work on synthetic whipping cream, the conclusion is reached that hardness of the fat is one of the most important factors in making a good and stable "cream." Discoloration in bread has been investigated and has been found in many cases to be due to carbonised cereal matter and minute accumulations of old dough.

The reviews on oils and fats and sugar emphasise the enormous fields over which additional assistance can be given to the industry now that the supplies of raw materials are progressively being freed.

### Marketing and Selling

A technical and advisory service for marketing, publicity, sales promotion, sales statistics, invoicing, and accounting for manufacturers of food and allied products is offered by G. Havinden Ltd. The company's export department deals with a wide variety of consumer goods in addition to food products, and is fully equipped to promote and develop sales in countries throughout the world.

### Fuel Efficiency

The Oldbury chain grate stoker, of which more than 2,500 have been installed in shell-type boilers, formed one of the main exhibits of Edwin Danks and Co. (Oldbury) shown on the stand of Babcock and Wilcox at the Manchester Fuel Efficiency Exhibition.

The unit on show was fitted with an ash extractor such as is supplied when the number of boilers is large enough to justify continuous ash extraction. Utilising a drag-link chain with cast-iron scraper bars, the extractor is designed to be removed as a one-piece unit. Like the stoker, it is of all-welded construction, and has no bearings or rollers at the rear end.

Also on view were the recently-introduced Minor stoker intended for hot-water boilers of ¾-2½ million B.T.U./hr. capacity, and an illuminated display cabinet showing the important features of the Oldbury design, and a model of the high velocity economic design of shell boiler.

The new Honeywell-Brown factory at Newhouse, Motherwell.

### New Honeywell-Brown Factory Opened

Approximately 100 guests attended the official opening of the new Honeywell-Brown factory at Newhouse, Motherwell, on September 18. The move from Blantyre to Newhouse took place during the company's annual two-week shut-down period so that there was no break in continuity of production.

Large one-piece pressed aluminium containers. *Photo Almin Ltd.*

### Aluminium Containers

A market survey completed last spring recommended the introduction of the large one-piece pressed container having no riveted, welded, or seamed joints to act as bacteria traps. Several thousands of the 2,600 cu. in. capacity box have now been produced having overall dimensions of $23\frac{1}{2}$ in. × $14\frac{1}{2}$ in. × $7\frac{3}{4}$ in. deep and weighing 6 lb.

Demands were then received for a shallower box, lighter for female operatives to handle when full and also suited for use where the contents are fragile and are prone to damage by virtue of their own weight, *e.g.* chocolates and soft fruit.

Warwick now introduce a smaller container with an effective depth of $5\frac{1}{2}$ in. and weighing only 4 lb. This new container interstacks with its fellows and also with the larger size. A lid which fits both sizes is also now available.

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### New Note from Birds

An excellent job of pack-brightening has been done by Alfred Bird and Sons for their new cereal—Rice Toasties.

Like the older carton, this pack has "triple protection"—a sealed inner bag of waxed paper, a cardboard carton, and an outer heat-sealed, moistureproof wrap of Cellophane cellulose film.

The new Rice Toasties pack with outer wrap of Cellophane.

## APPOINTMENTS AND RETIREMENTS

Mr. S. A. Lancaster, managing director of Procea Products, has been elected President of the Journeyman Bakers' and Confectioners' Pension Society.

▪

Mr. G. W. Meatyard, clerical manager of Huntley and Palmers, has been appointed local director of the firm's new northern factory now being constructed on the outskirts of Liverpool.

▪

At the annual general meeting of the British Standards Institution, Sir Roger Duncalfe, chairman of British Glues and Chemicals, was elected President to succeed Viscount Waverley, P.C., G.C.B., G.C.S.I., G.C.I.E., F.R.S.

▪

Mr. C. Chester-Browne has been appointed sales manager of Heston Aircraft Co. and their group of associated companies.

Mr. C. Chester-Browne.

Up to the time of this wider appointment, Mr. Chester-Browne had been concerned with the development and sales direction of Salisbury Precision Engineering Ltd.

His new responsibilities will include the sales direction and development of the Industrial Equipment Division of Heston Aircraft Co., which is engaged in the production of aluminium trays and containers designed specially for various uses in many industries, including confectionery and food manufacture.

▪

Mr. G. E. Richards, A.M.I.Mech.E., A.M.I.A.E., has been appointed assistant manager of the Prestcold Refrigeration Division of Pressed Steel Company with effect from October 1, 1953.

▪

Mr. William James Deverall, Works Manager, Joseph Crosfield and Sons, has been appointed a Director of that company and of William Gossage and Sons.

Mr. S. Yates-Dutton has been appointed Chemical Sales Manager of the company in succession to Mr. A. C. H. Cairns.

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### Box and Carton Design Competition

The analysis of the results in the recent British Paper Box and Carton Design Competition indicate that the greatest number of prizes were won by Alfred Kent and Co., one of the Eburite Group of Companies.

## ERECTIONS AND EXTENSIONS

Plans have been drawn up for the erection of a new sweet factory on a site at Friar Park Road, West Bromwich, by J. Finegan and Son.

▪

Plans have been prepared by Robinsons (Confectioners) to carry out extensions to their bakery in Queen Street, West Bromwich.

▪

Charles Leech, Ltd., confectionery manufacturers, of Barrack Road, Newcastle-on-Tyne, are extending their factory premises.

▪

Plans to extend their factory at Avondale Works, Old Shettleston Road, Shettleston, Glasgow, have been prepared by J. C. Watt (Meat), Ltd.

▪

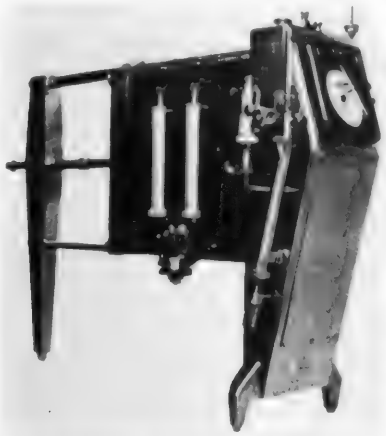
The Co-operative Wholesale Society have submitted plans to provide a new building and plant at the C.W.S. Canning Factory, Waveney Drive, Lowestoft.

▪

Plans have been drawn up by Walter and Hartley, manufacturing confectioners, to carry out extensions to their factory in Coleridge Road, Blackpool.

▪

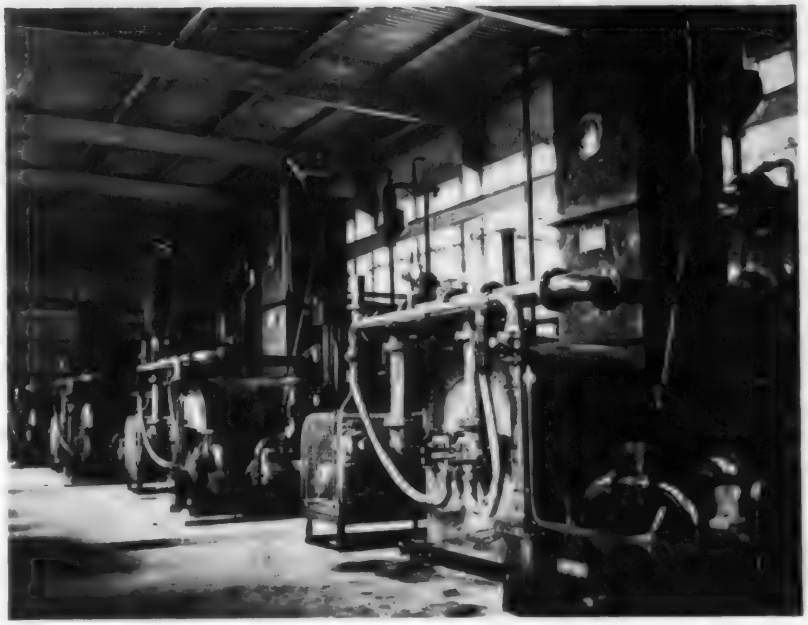
Park Cake Bakeries, Oldham, will shortly carry out extensions to their premises and install new plant.



**A.P.V. Paraflow for medium sized dairy.**

### New Pasteurisation Plant

A further advance in the development of milk pasteurisation plant is announced by A.P.V., who have introduced a new all-stainless Paraflow type for short-time pasteurisation in the medium sized dairy. This plant has all instrumentation, controls, and holder integral with the frame, and incorporates many new features. It is suitable for flow rates of 100 to 800 gallons per hour and occupies a floor space of only 6 ft. × 7 ft., inclusive of the float balance tank and milk pump.



**Four Hi-Nitrogen generators used to provide protective atmospheres for annealing furnaces of the Steel Co. of Wales.**

### Inert Atmospheres

In many processes connected with food and other industries, a chemically inert atmosphere is essential for the protection of the product being treated or packaged.

The most effective gas for this purpose is nitrogen which, until recent years, has been the most difficult to separate and obtain in pure form on a commercial scale at low cost. An inexpensive method of producing nitrogen of reasonable purity (99 per cent.) to any desired dryness down to a dew point of 70°F. has been devised by The Incandescent Heat Co.

In this plant, gas and air are measured and compressed by a booster. The mixed gases are then burned in a combustion chamber, which is surrounded by a boiler. The gases are then cooled to lower the dew point, and to remove the water vapour, which is passed out to the drain. The gas still contains carbon dioxide, which is removed by absorption in monoethanolamine. As the absorption of carbon dioxide is an exothermic action, the gas leaving the tank is cooled in a multi-tubular cooler. The final temperature is carefully matched with the temperature of the gas entering the absorption tank, and with the carbon dioxide rejection, which carries vapour. This ensures maintenance of a constant strength of solution through the system, depending on the relative dew points of the gas entering and leaving. Any entrained liquid or carry-over is extracted by a centrifugal separator and returned to the absorption chamber. At this point the gas is free from excess water and carbon dioxide but is saturated at an exit temperature.

The cooled gases are then passed through a Hydromaster drier, the drying medium being activated alumina. Where gas of extreme purity is required, and where there may be some risk of pollution of the drying medium by contaminants carried in the air during re-activation, a closed re-activation system is supplied.

From this apparatus, the gas is delivered dried to any desired dew point or conditions of relative humidity from +40°F. saturation to −40°F. saturation. Lower dew points can be held by using special apparatus. During the process, the amine solution is pumped through a filter to remove any precipitate formed during absorption. It passes in a regulated amount to the boiler, where the carbon dioxide is driven off at normal boiling temperature. The vapour is then passed through a stripper tower where it meets the incoming regenerated amine. The mixture of vapour and carbon dioxide is passed through a condenser. This drops out the liquid content which is returned to the boiler, leaving the carbon dioxide which is sufficiently pure for chemical processes.

The plant is automatic in operation, the only labour required being one attendant who could combine attention to the plant with other duties.

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### Industrial Ventilation

A complete range of industrial ventilators for all purposes was shown by Colt Ventilation at the Building Exhibition.

The exhibit showed how the ventilators operate, the ease with which they are fitted, and details of some of the more interesting schemes already installed in over 6,000 large factories.

Birds are wrapped in waxed paper before despatch from the recently opened packing plant at Watton-at-Stone.

### Poultry Plucking Streamlined

Considerable time and labour are being saved by the use of a new process at the recently opened poultry packing plant at Watton-at-Stone, near Hertford, where paraffin wax, a petroleum product supplied by Shell, is being used to speed up the removal of pin feathers and hairs and also to give the birds a better appearance.

The plant, operated by the Woodhall Poultry and Cold Storage Company and believed to be the best of its kind in the country, can handle between 1,500 and 2,000 birds a day. The actual processing time, from the killing of the bird to the removal of the last feathers by this new wax method, is less than five minutes.

On arrival at the factory, the live birds are placed in cages, weighed, graded, and priced. They are then stunned and killed by bleeding, to ensure whiter meat; next they are dipped in a scalding tank before rough plucking in a drum picker, which takes only a few seconds. Carried by conveyor belt to another floor, they are immersed in a bath of paraffin wax, then placed in cold water to solidify the wax coating before final stripping. Lastly, after cooling, the birds are sorted and wrapped individually in the waxed paper.

The prepared birds are either despatched for retailing, cold stored, or deep frozen in the locker store, which has an overall space of 5,200 cu. ft. A 7 cu. ft. deep-freeze locker can be rented for less than 3s. a week.

If desired, the items for storage—whether livestock, dairy produce, or vegetable—will be slaughtered or prepared by the company before deep freezing; bacon and ham curing is also undertaken.

### Awards to Bakers

Judging the entries of the three Procea National Award Cups took place at the Waldorf Hotel, London, on October 14.

This is the first year that the two new trophies for Procea brown bread and for Procea operatives' white bread have been awarded. The names of the winners were announced by Mr. S. A. Lancaster, managing director, after judging by Dr. A. J. Amos and Mr. R. C. Bartlett.

The winner of the Procea Gold Challenge Cup, 1952-53 for Procea white bread was the Astra Trading Co., of Cadoxton, Glamorgan, with Blakes Bakeries, of Bristol, as runner-up.

For brown bread, the cup winner was Puttock and Son (Worthing), with Mr. F. G. Graver, of Amersham, as runner-up.

The Challenge Cup for operatives' white bread was won by Mr. W. G. Prowse of Blakes Bakeries, of Bristol, with Mr. F. Skidmore, of the same bakery, as runner-up.

### Gelatin Capsules

Capsules of flavouring essences, chicken fat, and many other food products have long been known in the United States and their use in packed products confers a long shelf life on otherwise unstable goods.

The manufacture of gelatin capsules by the modern high speed rotary die process is carried out in Great Britain by R. P. Scherer, whose service operates in two ways. The complete capsule may be made by the company to the customer's formula or the customer may send his product to the Slough factory for encapsulation. Capsules are delivered in bulk cartons to manufacturers and wholesalers only, since the company have no direct retail connexions.

Capsules for the food industry are of two main types: the spherical or ovoid capsule which is soluble in hot liquids, or the bottle shaped capsule with a removable tip which may be squeezed to eject its contents. The gelatin envelope in either case is composed of pharmaceutical quality gelatin, thus being completely edible.

Mr. W. J. Puttock (*left*) receives the Procea Challenge Cup from Mr. S. A. Lancaster.

### Edible Oil Refining Plant

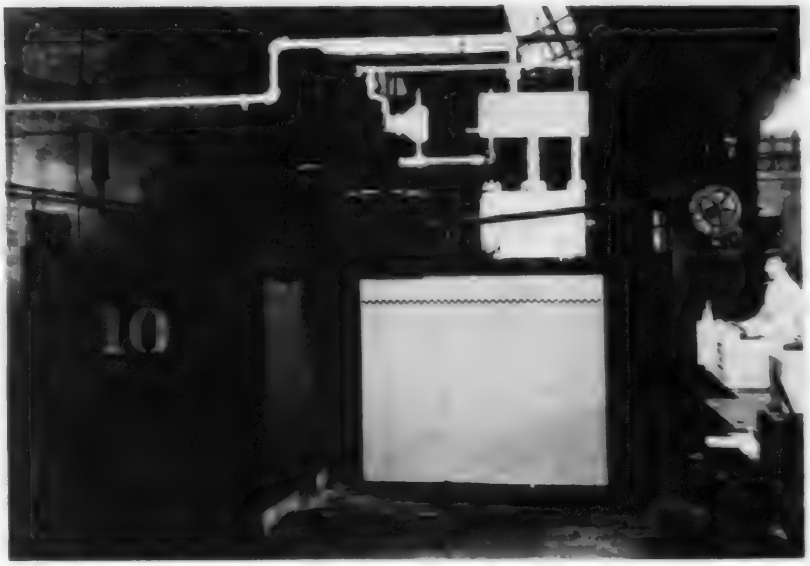
Complete edible oil refining plants, capable of handling a weekly output of over 200 tons of refined products, are designed and constructed by the Slough Engineering Co., who also undertake the erection of buildings in which to house them.

By designing neutralisers, bleachers, driers, deodorisers, and other items of plant in its own offices, it is able to keep the costs of new installations to a minimum. All welding and machining are done in its workshops and almost any type of refinery equipment from boilers to steam jets can be produced, supplied, and installed. Time and motion studies for plant and layout are also undertaken.

Of particular interest to the food industry is the Rotocooler for continuous heat transfer of fluids, developed primarily to overcome certain processing troubles which were being experienced with the oil refining plant at Slough.

The standard arrangement comprises a cabinet standing approximately 7 ft. high and weighing three tons, the installation being so compact that the floor space required is only 7 ft. × 4 ft. The plant is totally enclosed and an inert gas is introduced to the product by means of a needle valve. Thus the product is fully protected against contamination and its keeping properties are improved.

At the beginning of the process the raw materials are pumped from the storage tank to the mixing vessel and thence to the machine, either direct or *via* a tank controlled by a ball valve. At this stage air or other gases may be introduced. The product then passes into an agitated heat transfer cylinder. At this point it may be cooled by direct liquid ammonia expansion, brine or cold water, or it may be heated by steam or hot water. If the machine is used for vegetable fat shortening, for example, the cooling medium is liquid ammonia. Continuous and rapid chilling takes place and the product is brought to a supercooled condition.



Section of edible fat processing plant. *Photo Slough Engineering Co.*

The subsequent treatment of the fat is dependent on requirements, but the usual practice is to allow it to pass through one or more agitated "crystallising" cylinders before it is finally extruded through a texturing valve and packed. By combining instant chilling and plasticising with simultaneous agitation under an even pressure of 350 lb., this continuous closed process gives a uniform product.

Margarine manufacture necessitates a slight rearrangement of the machine and all internal surfaces in contact with the product require to be of stainless steel.

The heat transfer cylinder may also be used for steam heating, so that the machine has applications in a variety of other industries. In a typical application a starch suspension at 60° F. is pumped to a steam heated cylinder, wherein it is instantaneously raised in temperature to 230° F. At this temperature the starch cells are burst and the product is gelatinised. If required, the product may then be cooled instantaneously by passing it through a cooling cylinder. In this way starch products, salad cream, and mayonnaise may be prepared continuously in one machine, a process which offers substantial advantages over the orthodox batch methods of heat transfer.

Among the many other liquids or solid suspensions which may be processed in this machine are petroleum products, waxes and polishes, marshmallow, adhesives, gums and mucilages for the textile trade, cake batter, and linseed oil. The standard plant processes material at the rate of one to five tons per hour, but adaptations of the plant can be produced to give smaller quantities.

Dodge three tonners go into service for Procea Bread.

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### New Glass Sales Company

At the annual general meeting of the Triplex Safety Glass Co., Sir Graham Cunningham announced that Quickfit and James A. Jobling and Co. are jointly forming a new company for the development and sale of glass chemical plant and pipeline.

The new company will be called Q.V.F. Ltd. (the name is a contraction of "Quickfit" and "Visible Flow") and will have its offices at Mill Street, Stone, Staffordshire. Directors will be:

*Chairman:* Sir Graham Cunningham.
*Managing Directors:* Brian H. Turpin, J. A. Falconer, C.A., C. J. P. Hope, B.Sc., J. M. Bruce, and J. Window.

## COMPANY NEWS

The Directors of Weston Foods announce in respect of the period from March 30, 1952, to March 28, 1953, consolidated net profits of the Group of £1,378,542 (against £1,213,028 last year), after all charges including depreciation £146,024 (against £107,815). The profit applicable to the company's holdings, after taxation at £731,787 (against £690,267), is £646,755 compared with £522,761 last year.

There has been declared an interim dividend of 30 per cent. and bonus of 30 per cent. free of income tax on the Ordinary Share Capital (against 30 per cent. less income tax) for the period.

■

Consolidated net profits of Allied Bakeries for the year ended March 28 amount to £4,678,529 (against £3,666,308 last year), after all charges including depreciation £1,007,359 (against £828,444). The profit applicable to the company's holdings, after taxation at £2,879,525 (against £2,089,658), is £1,714,273 compared with £1,503,420 last year. As already announced, dividends of 30 per cent. on the Ordinary Capital have been declared.

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## BOOKLETS RECEIVED

The full range of equipment required for the sausage factory is described in a recent pamphlet issued by J. C. Wetter and Co. who also operate an efficient spare parts and repair service.

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A handbook published by Sorex (London) with the technical co-operation of Ward, Blenkinsop and Co. and Insecta Laboratories provides up-to-date information on rodent control and on Warfarin, the active ingredient of Sorexa, to ensure that the best possible results are obtained.

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The new fully automatic bottle decrater and re-crater is the subject of a pamphlet issued by Dawson Bros. Capable of handling bottles and crates of most shapes and sizes, this new machine is suitable for high outputs and requires the attendance of only one operator.

■

"The Manufacture of Printing Inks" is the subject of a full length article in the summer edition of *Inklings*, published by Coates Bros.

■

The wide range of plant made in stainless steel, copper, and aluminium for the food and other industries is described and illustrated in a leaflet published by Burnett and Rolfe.

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Electric motors and the part played by them in food production is the subject of a leaflet issued by Brook Motors. This illustrates their use in many fields of food manufacture including meat canning, flour milling, condensed milk production, chocolate making, dairy plant, and milk powder manufacture.

■

Because of their conviction that the liability to estate duty on holdings in certain types of private companies is excessive and damaging to the national economy, the Federation of British Industries have issued in booklet form the text of a memorandum "Estate Duty and the Family Business" which they have submitted to the Chancellor of the Exchequer.

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Swing hammer shredders for the reduction of fibrous materials to coarse or reasonably fine products are described in the new British Jeffrey-Diamond publication. Among the products for which this machine may be used are angelica root, copra, corn cob, fruit peel, ginger root, and licorice root.

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A 32-page bulletin, issued by Spirax-Sarco, concentrates on the practical considerations of steam for process and heating. Principal subjects covered by the bulletin are: "storekeeping" of steam; combined heat-and-power working; steam quality; steam distribution; thermostatic control; ways of reducing total heat demand; improving heat transfer at condensing surfaces; steam trapping methods; the air-in-steam problem and automatic venting; improved methods of condensate recovery; flash steam recovery. A final chapter considers the influence of long-standing habits on the problem of peak steam loads.

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An informative booklet on death duties and their effect upon privately-owned companies, written by Mr. Reginald Terrell, managing director of Business Brokers, Ltd., has recently been published. Its purpose is to explain to owners and those who, under Section 33 of the Finance Act of 1940, may have control of private businesses, the effect of death duties as they will apply to their estates and their beneficiaries upon their death, and to suggest methods by which the blow can be lightened and the preservation of their old family businesses assured.

## OBITER DICTA

● Time improves cheese, wine, and lawyers, but it is very bad for meat, bread, and women.—*Dr. H. Paul, Medical Officer of Health, Smethwick.*

● Never underrate the importance of the pig. He is the finest—and swiftest—food producer in the world.—"*City Press.*"

● I think singers have to weigh more than ordinary people; I adore lots of potatoes—mashed, fried, boiled, baked, whichever way they come.—*Opera singer Mattiwilda Dobbs.*

● Too many believe that all the British tourist needs for complete satisfaction is a huge steak—not necessarily a nicely cooked steak—just a steak.—*Mr. Niall Sheridan, chief of the Eire Tourist Board.*

● Fruit comes out of tins, and milk out of bottles. As a result, people tend to forget all about the trees and the cows, and the labour of the farmer that lies behind it all.—*Canon L. A. Brown.*

● Chocolate eating is largely an impulse the world over. If people lose the habit for one reason or another, it is very difficult to get it back.—*Mr. Paul S. Cadbury, speaking at the seventh World Cocoa Conference.*

● What nonsense it would be to invest any money in a non-profitable business; most of us at present are working all hours trying to make a go of the meat trade; I am, and I've had enough.—*Mr. J. L. Taylor, speaking at a meeting of the N.F.M.T. at Lincoln.*

● Since I became Minister of Food, I have had to attend functions of many trade associations at all of which I have been acutely conscious that the trade concerned was hoping that I would make some interesting announcement about their future.—*Maj. Gwilym Lloyd-George.*

● The latest form of misuse of milk bottles is to mix "home perm" solutions in them. No bottle washer will entirely remove traces of this solution, and when milk from such a bottle is poured into tea, the effect is startling; the tea turns a deep blue.—"*Sanitarian,*" *writing in "Municipal Engineering."*

### Christmas Greetings

Each year the Kingston-upon-Hull Development Committee co-operates with the industrialists and traders of the city in the production of a Christmas card which is sent to the customers of the city's industries throughout this country and overseas. This year's design consists of a reproduction of Mr. W. Goodin's painting of the King George Dock.

# World Food News

### Appointments

Dr. C. S. Boruff, technical director of Hiram Walker and Sons, Inc., Peoria, Ill., and member of the American Chemical Society since 1924, has been elected chairman of the Society's Division of Agricultural and Food Chemistry for 1954. Dr. Walter O. Lundberg, research director of the Hormal Institute at the University of Minnesota, was chosen chairman-elect, and Dr. D. M. Doty, of the American Meat Institute Foundation, Chicago, was re-elected secretary-treasurer.

### Food for Russia

A thousand tons of butter have been sold to Russia by New Zealand at £35 to £40 (N.Z.) a ton higher than the price paid by Britain. Negotiations are also being made for the sale of a further 2,000 tons.

Russian agents have also made enquiries for New Zealand meat. Although they have not stated prices they are willing to pay there is an indication that they would like to buy in large quantities. However, the Meat Board is prepared to dispose of only 500 tons.

The Russians are interested in New Zealand beef and lamb, but the Meat Board is not anxious to make a sale of the better grades. It would be prepared to make a sale of lower quality meats, including ewe mutton.

Under the terms of the British Meat Agreement, New Zealand has the right to sell 2 per cent. or 7,000 tons, whichever is the greater, of its meat exports to foreign markets. Any meat sold to Russia will come out of this quota.

### Centralised Poultry Marketing

Denmark's export poultry factories have centralised their sales of fowls, hens, roasting chickens, fryers, and spring chickens, eviscerated or non-eviscerated according to requirements, in an organisation called Danske Eksport-Fjerkrae slagteriers Salgsforening (Licensed Danish Export Poultry Factories' Association) in Copenhagen.

The new organisation follows six months' experimental period in establishing the new grading and sorting control which is one of the main features of D.E.F.S. The sale and despatch of the products from the several stations have been centralised, and forwarding and invoicing is done through the head office.

Weights of poultry are sorted as closely as 4 oz., and boxes of 12 chickens, weighing in total 18 lb. and upwards, or of hens and chickens in weights of 30 lb. and upwards (20 pieces), can be supplied according to requirements.

### Paper Sacks for Foodstuffs

The *Fédération Européenne des Fabricants de Sacs en Papier à Grande Contenance* held its annual conference under the presidency of M. Roger Bordat at Lausanne on October 16 and 17.

Particular emphasis was given to intensive investigation regarding the development in the use of multiwall paper sacks for the packing of foodstuffs to meet the general wish for improved hygiene during transportation and better storing and preservation of the goods.

The *Fédération Européenne* includes 78 manufacturers of multiwall paper bags representing Austria, Belgium, Denmark, Eire, Finland, France, Germany, Great Britain, Holland, Italy, Norway, Sweden, and Switzerland.

The next annual meeting is to take place in London in April, 1954.

### Exhibition at Poona Museum

Material for exhibition at the Lord Reay Maharashtra Industrial Museum of Poona (Bombay), India, is being asked for by the Curator and Secretary of the Museum. Permission to import exhibits for the exhibition, which is to be held next year, has been granted as a general permit by the Chief Controller of Imports, New Delhi, and certain shipping facilities are also being offered by the High Commission for India in Britain.

Contributions are required in the form of large photo-murals designed for the exhibition on such subjects as machines, tools, scientific appliances, working models, catalogues, and books.

### Fruit and Fish Cannery

Tropical Australian fruit and fish will be canned at a new £20,000 cannery to be opened at Ballina, on the New South Wales North coast, early next year.

Mr. Neil Cottee, a director of North Coast Industries which will open the cannery, said the fish would be tried on the home market first, and if it were a success the firm would export all it could.

The company's present equipment would handle 8,000 lb. of fish and 200 cases of fruit a day. This capacity could be easily doubled or trebled.

The company will begin to process fruit next January and fish in February.

### Change of Address

The Fleischmann Laboratories have moved from Bronx County to Connecticut, where their address is Standard Brands Inc., The Fleischmann Laboratories, Betts Avenue, Stamford, Connecticut.

### Food Labelling in Panama

The new food labelling regulations of Panama require that all packaged, bottled, or canned foodstuffs sold bear labels containing the following information in Spanish: name or commercial designation of article; components, if articles involved are other than eggs, meats, etc., specifying the class or type and mixture not known under specific names; net weight or volume contents and quantity; and country of origin.

### Rhodesian Sugar Scheme

Preparatory work is in progress for irrigated sugar cane growing on an area of 4,000 acres at Chirundu, near the Zambesi river. The Rhodesia Sugar Refinery is pioneering the scheme, which is based on the successful results of a pilot plantation started in October, 1951.

Work on a cane crushing plant is expected to begin in the next four months. A larger plant will ultimately be built when cane cultivation expands.

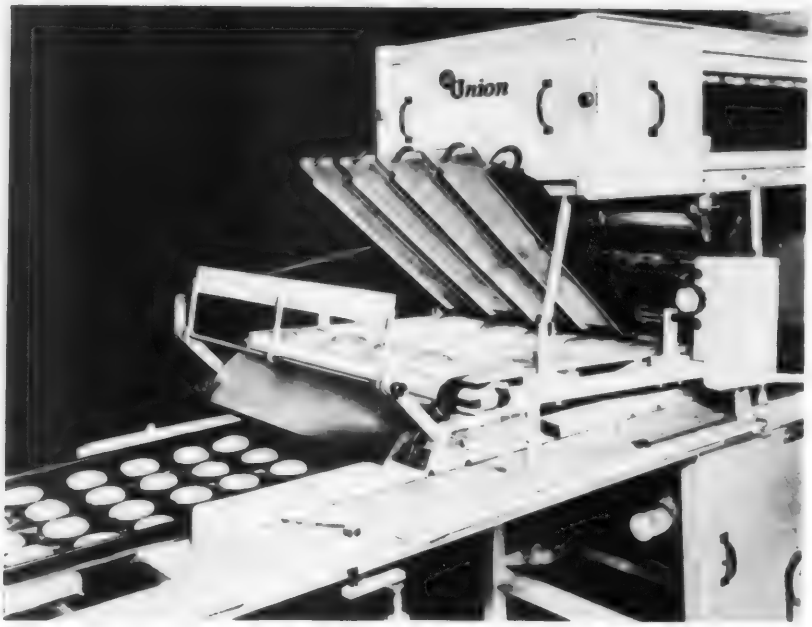
Initially, the scheme will concentrate on the south bank of the river, and this area is expected to yield around 10,000 tons of sugar annually when the project is in full swing. At a later stage the north bank scheme will be started and is scheduled to be producing about 20,000 tons annually by 1957-58.

### Packaging at Parma

Much interest was evinced in the International Congress on Food Packing Materials which took place within the framework of scientific and technical studies promoted by the recent Preserves and Packing Fair at Parma.

The international character of the Congress was evidenced by the attendance of foreign experts such as M. Alquier, President of the National Syndicate of Tins and Capsules Manufacturers, who spoke on standardisation problems for food cans; Mr. Paine, Chief Research Officer in the Packing Material Division of PATRA, who dealt with some of the problems, at present topical in Britain, relating to packing materials for food products.

Other speakers were Dr. Crespi, on the use of corrugated cardboard as packing material, and Prof. Cavallaro on the use of gaseous inhibitors against the corrosion processes on metallic surfaces. Signor Hugony discussed the physico-chemical characteristics of collapsible small-size aluminium tubes; Dr. Capuano spoke about cans for milk preservation, and Dr. Olcese discussed the subject of prepacking horticultural products in polyethylene.




**The pressure board assembly of the Pat-O-Mat in position for the production of hamburger buns.**

### Mechanised Bun Production

A new automatic bun make-up and panning unit, known as the Pat-O-Mat, which picks up the dough pieces produced by a bun machine and discharges them on to a conveyor belt, has been devised by the Union Machinery Company.

Empty pans fed into the unit move forward and the dough pieces are deposited uniformly in the centre of each pan for the production of hamburger buns. Frankfurter buns are produced by lowering a pressure board into position by which the flattened pieces of dough are curled and moulded and automatically deposited into the frankfurter pans.

### Potato Essence

A Norwegian chemical firm claims to have developed an entirely new method of processing potatoes, by which much of the water content is eliminated, thus ensuring almost unlimited durability and frost resistance. The processed potatoes will be marketed in the form of hard grains similar to rice. As they will already have been boiled during processing, all that needs to be done before eating is to soak them for a few minutes in water.

### Synthetic Rice

A synthetic rice, using up to 70 per cent. wheat flour, has been reported from Japan by *The Southwestern Miller*. Designed only as an "extender" for mixing with rice in cooking and not to be eaten alone, the product has advanced to a stage where U.S. Government food officers are planning to prescribe certain standards for its manufacture.

## OVERSEAS ENQUIRIES

### Tea Packers

Oy. Mediator Ab., Mikonkatu 9, Helsinki, Finland, require the name of a United Kingdom firm of tea packers who could produce 50 and 100 gramme packages and who might wish to appoint an agent in Finland.

Interested United Kingdom firms should communicate direct with the enquirer at the address given above.

■

### Food Machinery

The Ministry of Defence for Thailand are considering plans for food processing for the Thai armed forces and may shortly be entering into contracts for the following types of machinery:

1. Machinery for cooking, dehydrating, and packing rice into 1 lb. paper boxes and 1 kg. and 5 kg. paper cartons. (Packing must be airtight.)
2. Machinery for toasting dehydrated rice and packing into 1 kg. paper bags.
3. Machinery for the preparation of curry, comprising chopping machine for vegetables, pulverising machine for chilli, onion, garlic, and spice, mixing machine, drying machine, machine for packing into ½ kg., 1 kg., 5 kg., and 10 kg. paper bags or boxes, canning machine for vegetables, and coconut milking machine and packing machine.
4. Machinery for chopping, boiling, and packing meat into 1 lb. and 1 Imp. gallon tins, including can machinery.
5. Machinery for producing wrapped, dehydrated cakes of curry gravy, vegetables, and meat. This would include mixing, boiling, dehydrating, pressing, and wrapping machines.
6. Machinery for preparing and packing lard into bottles (beer bottles) and tins.
7. Machinery for preparing fish sauce and for bottling and corking it.
8. Machinery for preparing salt powder, packing it into 1 lb. bottles and wrapping in transparent cellulose film.
9. Machinery for the preparation and packing of vermicelli soup, including a chopping machine for vermicelli and bean cake and a steriliser.
10. Machinery for drying, pulverising, and packing salted fish.
11. Machinery for sterilising and packing (in transparent cellulose film) dried banana.
12. Steam generating sets suitable for above plant.

No information has been given as to the quantities of machinery required.

Those manufacturers who are interested should send details of the machinery they can offer to the Ministry of Defence, Bangkok, Thailand. The Ministry would be particularly glad to have catalogues; any information provided should cover varying sizes of machinery.

■

### Rice Processing Equipment

The Victor G. Mendoza Co. are interested in importing rice processing equipment, particularly milling and drying machines.

United Kingdom firms who are interested in this enquiry should write direct by air mail to Señor Ramiro Ortiz, Victor G. Mendoza Co., 23, Esquina a Infanta, La Habana, Cuba, quoting prices in U.S. dollars (c.i.f. Havana or f.o.b. United Kingdom port, including packing).

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### Apple Juice Concentrate

The Commercial Section of the British Embassy, Mexico City, wish to receive urgently quotations for apple juice concentrate as follows:

Quotations for both 500 and 1,000 barrels of apple juice concentrate each containing approximately 55 gallons. The barrels to be of oak, sterilised, and paraffinised inside and bound with eight steel hoops.

The density of the concentrate should under no circumstances exceed 10·328 lb. per gallon at 59° F. and should be 1 per cent. below this to be safe.

Offers should be made c.i.f. Vera Cruz including a 5 per cent. agent's commission. The buyers are prepared to open an immediate letter of credit, payment to be made on receipt of pro-forma invoice. Delivery must be rapid.

The final buyer is Sidral Mundet, S.A., one of the largest manufacturers of non-alcoholic cider in Mexico, whose yearly requirements of apple concentrate run to over 2,000 barrels as above. Should the United Kingdom be able to supply this product there are also other buyers who might be interested.

Interested United Kingdom firms should send quotations to the British Embassy (Commercial Section), Lerma 71, Mexico 5, D.F., P.O. Box 96 Bis, Mexico, quoting reference O.T. No. 631 (133/1).

### Canned Apples and Apple Products

Unecor Sales Company, 401, Broadway, New York City, 18, N.Y., are interested in securing offerings for the import into the United States from Great Britain or its possessions of institutional and consumer-size cans of solid pack sliced apples for pie baking; also apple sauce and concentrated apple juice (the latter in drums).

Interested firms should communicate direct with the company stating full particulars as to quantities, quality, packing, net drained weight, prices preferably c.i.f. New York, terms, and commission permitted.

*

### Cheap Line of Confectionery

The Merley Candy Co., of 40, Braly Court, Pasadena, California, a firm of confectionery wholesalers selling to supermarkets and the lower class trade, would welcome the offer of a cheap British confectionery line for packaging and marketing under their own name. The confectionery should not cost more than 15 cents per lb. c.i.f. Los Angeles.

Samples of the type of confectionery required are available for inspection by appointment in Room 801, Export Services Branch, Lacon House, Theobalds Road, London, W.C.1. A few samples are available on loan to interested firms in order of application.

United Kingdom manufacturers interested in this enquiry should communicate by air mail direct with the U.S. firm, quoting c.i.f. prices in dollars and delivery dates.

*

### Jams and Marmalades

The Frederick Pordes Co., of 323, Gloucester Buildings, Hong Kong, has expressed interest in representing a United Kingdom manufacturer of jams and marmalades.

Interested firms are invited to communicate direct with the company giving full details of their products, c.i.f. prices if possible, etc.

### Fresh Apples

Adams, Brown and Co., Ltd., P.O. Box 6037, Nairobi, wish to contact a source of supply of fresh apples from the United Kingdom.

Firms interested in this enquiry are invited to write direct to the company.

*

### Rye, Potato, and Soya Flour

The National Baking Co., 43, Half Way Tree Road, Cross Roads P.O., Kingston, Jamaica, have expressed interest in receiving quotations from United Kingdom suppliers of rye flour, potato flour, and soya flour.

Their approximate monthly requirements are 100 bags of 100 lb. each.

United Kingdom firms who are interested in this enquiry should send details and quotations direct.

*All foodstuffs destined for the United States are subject to the United States Food and Drugs Administration Regulations.*

# News from the Ministries

### Cheese from Canada

Canadian cheese worth about £1 million has been bought by the Ministry of Food from the Ontario Cheese Producers' Association.

The present purchase, which amounts to about 10 million pounds in weight, is a little more than is needed to provide a 2 oz. ration for one week.

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### Decontrol of Milk Products and Fats

All controls over the distribution, use and prices of butter, margarine, cheese, cooking fats, and condensed and dried milks will end during 1954 and imports on private account will be resumed.

The general intention is to decontrol condensed and dried milks early in the spring, to take butter, margarine, cheese, and cooking fats off the ration in the early summer, and to complete the process of decontrol by the autumn.

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### Imports of Californian Raisins

Twenty-two thousand tons of Californian seedless raisins of the 1953 crop have been bought by the Ministry of Food for arrival in the United Kingdom in the late spring of 1954. This purchase, the last to be made by the Ministry of Food before control of dried fruits ends on December 1, 1953, will help to maintain supplies of dried fruits for all purposes during the transition from control to free conditions.

For the present, no arrangements are being made for the licensing of private imports of dried fruit from dollar sources.

### Canned Fruit to be Decontrolled

Canned pineapple, grapefruit, and mandarin oranges are to be decontrolled at the end of 1953. No further purchases of these varieties of canned fruit will be made by the Ministry of Food; the arrangements for imports by private traders in 1954 will be announced by the Board of Trade later.

The Ministry will continue to buy and to control the distribution and prices of canned apricots, peaches, and pears, since the quantity of these popular canned fruits which can be bought from non-dollar sources is small in relation to the demand.

It is also announced that the next allocation of canned fruit consisting of apricots, peaches, pears, pineapples, and grapefruit will reach the shops in good time for Christmas.

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### Merchandise Marks Act, 1926

An application for an Order in Council under the Merchandise Marks Act, 1926, to require the marking of imported pears, cherries, broccoli, cauliflower, brussels sprouts, carrots, and lettuce in their fresh or raw state with an indication of origin has been referred for enquiry to the Standing Committee set up under the Act by the Minister of Agriculture and Fisheries, the Secretary of State for the Home Department, and the Secretary of State for Scotland.

Under the provisions of the Act, the Committee must in every case referred to them consider whether the goods should bear an indication of origin at the time of sale or exposure for sale. They also have discretion to consider and report whether such goods should bear an indication of origin at the time of importation.

Any representations should be addressed as early as possible to Mr. C. H. Dee, the Secretary of the Merchandise Marks Standing Committee, 8, Whitehall Place, London, S.W.1.

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### Change of Address

The Fresh Fruit and Vegetables and Fish Branch of the Ministry of Food has moved to Great Westminster House, Horseferry Road, S.W.1, from 29, York Terrace, Regent's Park, N.W.1. The new telephone number is VICtoria 8511.

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### British Food Mission to Close

Following the decontrol of a number of important commodities, including cereals and animal feedingstuffs and certain oils and fats, it has been decided to close the Food Mission in Buenos Aires. It has been agreed with the Secretary of State for Foreign Affairs to replace the Mission by the appointment of a Food Attaché to the Embassy. Mr. R. H. Smyth, O.B.E., of the Ministry's Supply Secretariat, who has been a member of the delegation to the recent meat negotiations in the Argentine, has been appointed to fill the new Attaché post.

Mr. A. J. Cooke, C.M.G., who has been head of the Food Mission since its formation in 1946, will continue to give his services as honorary food adviser to the Ambassador, and Mr. M. M. Angus, who has been meat representative on the Mission, will, on return to his own business, continue to act as adviser on meat shipments.

# Information and Advice

**This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.**

### Nougat

B.6778. *We should be glad if you could supply a working formula for nougat using gelatin.* (Herts.)

A formula for hard nougat of the chewing type, which is usually cut into bars or cakes and wrapped in waxed paper, is as follows:

| | *lb.* | *oz.* |
|---|---|---|
| Granulated sugar | 60 | — |
| Corn syrup | 70 | — |
| Gelatin | 3 | — |
| Fine coconut | 20 | — |
| Vanillin | — | 1 |

The gelatin is soaked in cold water until pliable. The sugar and corn syrup are placed in a steam pan with sufficient water to cover, and heated until the sugar is dissolved completely, then cooked to 268°F. The batch is poured into a slightly warm nougat beater, and the gelatin added and beaten briskly until quite light and stiff, the fine coconut and vanillin then being added and allowed to mix in thoroughly. The batch is poured either on to wafer paper or well-dusted and oiled cooling slabs to the thickness required, divided into conveniently sized slabs, and cut into bars on the nougat knife. If necessary, one half of the batch may be coloured pink in the beating machine and poured on the first layer on the slab to produce a two-coloured bar.

If a soft nougat is required it should be cooked to 260 to 265°F. If the batch is cooked *in vacuo*, Tate's Grade 30 sugar may be substituted for granulated in all nougat formulae; the colour of the final nougat is not impaired.

### Buttered Almonds

B.6779. *Could you please provide us with a formula for buttered almonds?* (Herts.)

The following may be used as a basis for trial:

| | *lb.* |
|---|---|
| Granulated sugar | 24 |
| Corn syrup | 12 |
| Butter | 1½ |

The sugar and corn syrup are dissolved in water and cooked to 305°F. Heating is discontinued, and the butter carefully added and stirred slowly. The batch is transferred to heated dipping pots. The centres to be dipped are thrown a few at a time into the pot and retrieved by means of a dipping spoon, and placed on oiled metal plaques. The dipping must be carried out rapidly, so that the prolonged heating of the mass does not darken the colour.

When set, the goods are packed in well-sealed containers or wrapped in waxed paper as quickly as possible.

### Tenderising Sausage Casings

B.6780. *Could you tell us of a process or any other treatment which would render the skins of our canned sausages more tender?* (New Zealand)

The following suggestions may be of some assistance when sheep casings are used:

1. A small quantity of acetic acid added to the water in which the casings are soaked might help.

2. One of the tenderising agents, such as papaya, could be employed, although this would have to be carefully controlled in order to obviate excessive tenderness.

3. It would be possible to use a device somewhat like a potato chipper, the can being almost filled with sausage meat and then divided into portions by forcing this device down through the pack. Between each operation it is dipped into an edible oil which forms a film between each of the segments of meat, preventing them from cooking up in one mass.

If sheep casings are not used, a pectin alginate casing of 20 to 22 mm. is now being made, which should be ideal for this purpose; it would be very tender and would probably disappear entirely during normal processing.

### Marzipan Manufacture

B.6818. *Could you recommend a formula for marzipan?* (Lancs.)

Two methods may be used for the manufacture of marzipan: the German method, which embodies the cooking of ground almonds and sugar, with or without the addition of inverts; and the more general method in which a sugar-corn syrup solution is precooked and mixed with ground almonds and fondant.

The following formula is based on this latter method:

| | *lb.* | *fl. oz.* |
|---|---|---|
| Granulated sugar | 60 | |
| Corn syrup | 14 | |
| Ground almonds | 30 | |
| Fondant | 14 | |
| Glycerine | | 4 |
| Almond oil | | ¼ |

The almonds are sorted, blanched, and refined, and placed in a U-shaped mixing machine. The sugar and corn syrup are cooked in a steam pan to 250°F. The cooked batch is poured on the ground almonds, and the fondant and glycerine added. After allowing to mix thoroughly, the batch is cooled and passed through the refiner. The marzipan may be rolled into sheets of any desired thickness and cut into bars which are crystallised.

Alternatively, the paste may be worked into mosaic patterns and drawn out after the fashion of boiled sugar batches into various shaped rods, which are cut into pieces on a guillotine, then crystallised in syrup at 34° Baumé for six hours.

### Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.6747. *Cheese spread, conveyors, and oil burners.* (Berks.)
B.6748. *Fish cakes.* (Glos.)
B.6752. *Whole powdered milk plant.* (China)
B.6753. *Meat tenderiser.* (Somaliland)
B.6755. *Canned ox tongues.* (France)
B.6756. *Popcorn.* (Northumberland)
B.6758. *Can sizes.* (Surrey)
B.6760. *Canned kidney soup.* (N. Ireland)
B.6761. *Gas analyser.* (Holland)
B.6762. *Protein product containing lactose.* (Holland)
B.6764. *Vapour steam cleaner.* (Singapore)
B.6765. *Wrapping machines.* (Yorks.)
B.6766. *Roasted and salted peanuts.* (Berks.)
B.6767. *Triple roll sheeting machines.* (Notts.)
B.6778. *Extract of meat.* (Africa)
B.6774. *Citrus fruits.* (America)
B.6775. *Insecticides.* (Ireland)
B.6776. *Grader for shelled almonds.* (Scotland)

# Recent Patents

698,564. AKTIEBOLAGET SEPARATOR: Method of decolorising neutralised fatty oils.
698,645. POCOCK, A. G., and KIRK, C. R.: Cap feeds for bottle capping machines.
698,652. HENKEL, sen., A.: Sugar pulling machines.
698,697. KENWOOD MANUFACTURING CO., LTD.: Food mixing device.
698,702. DRYDEN AND SONS, LTD.: Extruding machines, *e.g.* for cattle food.
698,760. GLACES GERVAIS: Coating of iced confectionery and ice creams.
698,814. RANDALL AND SON, LTD., J. H., and BASKETT, D. W.: Apparatus for making frozen confections.
698,815. SOC. ANON. MACCHINE INDUSTRIA DOLCIARIA CARLE AND MONTANARI: Grinding machine for the final working up of chocolate.
699,407. METAL BOX CO., LTD., STEPHENS, W. A., and EVANS, A. J. P.: Closures for jam jars and like containers.
699,422. G.D. SOC. ANON.: Mechanism for wrapping caramels, pastilles, and articles of similar shape.
699,511. CO-OPERATIVE WHOLESALE SOCIETY, LTD., EALES, J. G. R., and HALE, E.: Storage racks for cheeses.
699,574. VICARS, LTD., T. AND T.: Wafer ovens.
699,629. POTTS, F. C. (Thalmann, F.): Method and machine for the necking of sausages.
699,692. BOYER, R. A.: Protein food products.
699,864. LAMBINON, G.: Manufacture of sugar.
699,900. LAMBINON, G.: Scum remover for use in the manufacture of sugar.
700,032. STEEL BROS. AND CO., LTD., and HOLL, F. M.: Apparatus for the treatment of rice and other cereals.
700,093. CELLOPHANE SOC. ANON.: Machines for the manufacture of air-tight packing bags.
700,140. GENERAL FOODS CORPORATION: Puffing cereal grains.
700,188. APLIN AND BARRETT: Sterilisation of parts of metal containers used in canning foodstuffs.
700,196. MELICH, H.: Apparatus for cutting bricks from a bar of plastic material, *e.g.* ice cream.
700,205. NIKROVAERK AKTIESESKAB: Machines for tempering chocolate and similar masses.

### ABSTRACTS OF BRITISH PATENTS

#### New Ingredient for Foodstuffs

A novel process has been devised for the preparation from gluten of a product which takes the form of a stable emulsion in which the gluten is dispersed through it, probably in a partially degraded form and which is therefore suitable for incorporation in foodstuffs as a liquid component.

The emulsion contains a considerably higher proportion of available nitrogen apparently in the form of free amino acids than does the original gluten. Thus it is possible to prepare a liquid proteinaceous product which is suitable for addition to many foodstuffs and which has the important advantage of having a considerably higher available nitrogen content than the original gluten.

695,145. *Percival Sydney Jewell, George Cocker Ingram, and James Gordon Travis King.*

#### Skinless Sausages

A device for use in forming skinless sausages, constituting in effect an adaptor for a sausage-filling machine, comprises a self-contained closed vessel, that is closed by its own boundary walls, having an inlet connexion attachable to the outlet of a filling machine and a set of nozzles, a tray for receiving the discharge from the nozzles, and an inclined track adapted to support the tray.

The tray may be of aluminium and may have upturned sides slotted at intervals.

The track may consist of a series of parallel rollers supported by stringers.

698,343. *John McRae.*

#### Cooling Sealed Food Cans

The objects of this invention are:

1. To provide a safe, simple, and inexpensive way of cooling heated food-containing cans sealed under conditions causing non-condensable gases to be included in their head spaces.

2. To eliminate, in continuous can sterilising processes, the conventional forms of pressure cooling with their complex and costly equipment without exposing the cans to the risk of buckling.

3. To provide a simple and effective method of handling sealed cans passing through a continuous steriliser to effect cooling in a manner safeguarding them from both buckling and panelling alike, without the use of costly split-pressure-cooling equipment.

4. To provide apparatus for treating sealed food-containing cans, as they emerge from the steriliser, in such a manner that they may be cooled in coolers at atmospheric pressure without the danger of buckling.

5. To provide a can discharge valve, for continuous sterilisers, adapted to decrease rapidly the internal can pressure in such a manner that the discharged cans may safely be cooled in atmospheric coolers.

694,749. *Food Machinery and Chemical Corporation.*

#### Mills for Curd-like Substances

A hand fed mill for curd is described wherein there is no possibility of an operator forcing the curd down by hand with consequent risk of injury. The curd is milled more speedily at least as fast as the curd can normally be fed into the hopper, and the mill is transportable so that it can be moved to the desired position above the curd cooler.

The mill comprises a supporting structure, rotating beaters driven by an electric motor, a feed hopper above the beaters, a pair of feed rollers driven by the motor and located immediately below the hopper outlet and above the beaters, the axes of the feed rollers being parallel and in a common horizontal plane with the beaters rotating on axes parallel therewith and below. The hopper outlet is of narrow elongated form and the feed rollers extend for substantially the full length of the outlet, the height of the hopper and the width of the outlet being such that an operator's hand cannot normally pass down through the outlet. The mill is supported on or adapted to be carried by a wheeled framework whereby the mill can be wheeled to locate the beaters above a curd cooler or other receptacle for the milled substance into which it is discharged directly.

697,094. *Highbridge Bacon Co., Ltd.*

#### Plastic Materials for Biscuits

An improved apparatus is described for applying to one surface of a biscuit, cake, or the like article of confectionery, a layer of plastic material such as cream, jam, jelly, or the like. The biscuit is displaced by dogs on a moving conveyor, by engagement with its rear edge, along laterally spaced ramps adapted to support the biscuit over a minor area alone of its surface, progressively past a stencil moving in synchronism therewith, through the openings of which the layer of plastic material, such as cream or the like, is applied to the upper surface of the biscuit or like article.

The object is to provide a machine where the risk of breaking the biscuit or the like friable article of confectionery is reduced to a minimum, the layer of material is accurately applied to the desired part of its surface, and the risk of the applied material coming upon other parts of the machine is reduced to a minimum.

695,204. *T. and T. Vicars Ltd.*

### ABSTRACTS OF GERMAN PATENTS

#### Sausage Dividing Machine

A sausage dividing machine is provided with a filling piston moving freely to and fro. The container cover is provided with an adjustable bolt transverse to the line of piston travel along a diameter of the container and the filling piston is provided with two series of projections for these bolts, which are disposed symmetrically to the direction of adjustment of the bolt.

848,312. *Josef Vogel.*

#### Baking and Roasting Device

A dome-like roasting and baking device can be placed on a source of heat with its open under part thereon. Both the isolating part disposed over the inlet opening of the under part and the cover of the upper part are double walled and each encloses a heat insulating hollow space.

850,663. *Willy Batthe.*

#### Spray Preventer

A device is described for preventing the spraying of the wall adjacent to the heating plate; it comprises a quadrangular base plate divided into halves hinged together, to which one or two side walls are hinged with their short sides, their long sides being so arranged that one side wall folds inwardly against the other side wall and together with this fits downwardly on to one half of the base plate and can be covered by the fitting thereover of the other half of the base plate.

850,069. *Heinrich Steinkampf.*

*British patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.*

# Trade Marks

**VIRGIN.**—701,992. Vinegar. **Sarson's, Limited,** 2a, Rita Road, London, S.W.8; Manufacturers and Merchants.

**ZWANENBERG-OSS.** — 706,333. Meat products (for food), and meat extracts; broths and preparations for making soups; preserved, dried, and cooked fruit and vegetables; pickled onions and pickled gherkins; fruit pulp; edible shellfish and foodstuffs made therefrom, and edible oils, edible fats, salad cream, and mayonnaise. **Zwanenberg's Fabrieken N.V.** (a Limited Liability Company incorporated under the laws of the Netherlands), Gasstraat, Oss, Holland; Manufacturers and Merchants.

**GOLDO.**—709,662. Tea and coffee. **Harold Stuart Wilson,** trading as **Elgie and Company,** 10-16, New Station Street, Boar Lane, Leeds, 1; Tea Importer and Merchant.

**FLAVOR-MIST.**—716,206. Flavourings (other than essential oils) for ice cream and for beverages. **W. J. Bush and Company, Limited,** 28, Ash Grove, London, E.8; Chemical Manufacturers.

**KINGFISHER.**—717,207. Eating chocolate, chocolates, and non-medicated sweetmeats. **Laurence Harrison, Limited,** Eiddew, Penrhyndeudraeth, North Wales; Manufacturers and Merchants.

**ROCKHILL.** — 717,208. Canned and potted fish. **International Packers-Africa (Pty.), Limited** (a Company duly organised under the laws of South Africa), Winchester House, 74, Long Street, Capetown, Union of South Africa; Manufacturers.

**ESKIMO.**—717,970. Packets or bags, made of transparent film laminated to aluminium foil, for use as food wrappings or coverings in refrigerators. **John Dickinson and Company, Limited,** Apsley Mills, London Road, Hemel Hempstead, Hertfordshire; Manufacturers and Merchants.

**VITALEN.**—718,018. Dried wheat gluten for food. **Vaughan Thomas and Company, Limited,** 52, Mark Lane, London, E.C.3; Merchants.

**DEXRAY.**—718,270. Installations and apparatus for lighting, heating, cooking, refrigerating, and ventilating, and parts and fittings for all the aforesaid goods. **Dexray Engineering Company, Limited,** Dexray Works, Brock Street, Lees Street, Manchester, 1; Manufacturers and Merchants.

**MULTICLONE.**—718,596. Maize starch for use in manufactures. **N.V. Stijfselfabriek "De Bijenkorf" v.h. M. K. Honig** (a Limited Liability Company organised under the laws of the Kingdom of the Netherlands), Lagedijk 3, Koog aan de Zaan, Netherlands; Merchants.

**MARIANNE.**—718,816. Sugar confectionery and chocolate confectionery, none being medicated. **M. A. Craven and Son, Limited,** French Almond Works, Coppergate, York; Manufacturers.

**PINAFORE.**—718,974. Butter and cheese. **E. E. Bocquet, Limited,** 43, Tooley Street, London, S.E.1; Merchants and Manufacturers.

**FRODESS.**—719,362. Frozen foods for human consumption. **Lily of the Valley Creamery Ices, Limited,** Bromyard Road, Worcester; Manufacturers.

**NEWTIME.**—719,403. Chocolate confectionery and sugar confectionery, none being medicated. **Quality Foods, Limited,** 179-181, Park Avenue, London, N.W.10; Manufacturers.

**JUMBO.**—719,439. Chewing gum and non-medicated sugar confectionery. **Henry W. Peabody and Company of London, Limited,** 16, Eastcheap, London, E.C.3; Merchants.

**SLIDING JUNGLE.**—719,466. Chocolate and non-medicated chocolate confectionery. **A. Adler, Limited,** 14-18, Nile Street, City Road, London, N.1; Manufacturers.

**SENTOSA.**—719,623. Tea, cocoa, sugar, rice, tapioca, sago, flour, cereal preparations for food for human consumption, bread, biscuits (other than biscuits for animals), cakes, pastry, non-medicated confectionery, ices, honey, treacle, yeast, baking powder, salt, mustard, pepper, vinegar, sauces, spices (other than poultry spice), and ice. **Edward Hutchinson, Limited,** Mersey Flour Mills, 59, Burlington Street, Liverpool, 3; Flour Millers.

**SUNBRITE.**—719,662. Edible oils and edible fats. **Western Margarine, Limited,** Westfields Road, Acton, London, W.3; Manufacturers.

**MAMIE.**—719,668. Non-medicated sugar confectionery. **Charles Gardiner, Limited,** 54, Bermondsey Street, London, S.E.1; Manufacturing Confectioners.

**"HIGHWAY."**—720,055. Non-medicated boiled sugar confectionery, chocolates, and toffees. **Robertson and Woodcock, Limited,** Trebor Works, Katherine Road, London, E.7; Manufacturers.

**BAZLO.**—720,577. Dairy products (for food). **Robert Laurie Walsh,** 30, Stumperlowe Mansions, Sheffield, 10; Dairy Farmer and Merchant.

**NORTH CROWN.** — 720,687. Coffee, sugar, rice, tapioca, sago, flour, cereal preparations for human consumption, bread, cakes, pastry, ices, honey, vinegar, spices, ice, and yeast (for food). **William Hodkinson and Sons, Limited,** 74, Stuart Street, Bradford, Manchester, 11; Wholesale Grocers and Provision Merchants.

# New Companies

**North West Canners (England), Limited.** (523296.) 114, Notting Hill Gate, London, W.11. To carry on business of canners, manufacturers, and preservers of and dealers in fruits, vegetables, etc. Nom. cap.: £100 in £1 shares. Dirs.: H. Roberts, Farthings, Strabane, Co. Tyrone, N. Ireland, and W. D. Redmond, 152, Holland Park Avenue, London, W.11.

**Hilton-Wright Company, Limited.** (523315.) Granada House, Gabriels Hill, Maidstone, Kent. To carry on business of manufacturers of and dealers in food and foodstuffs of all kinds, etc. Nom. cap.: £4,000 in £1 shares. Dirs.: G. Wright-Anderson, Four Swans Hotel, North Street, Sudbury, Suffolk, and E. T. H. Toomey, 69, Northaw Road East, Cuffley, Herts.

**Bari Food Products Company, Limited.** (523391.) 11, Dale Street, Liverpool, 2. Nom. cap.: £5,000 in £1 shares. Dirs.: C. N. Hearn, Gilbre Point, Stanley Road, Hoylake; L. Niels, 3, Brookdale Avenue, Greasby, Cheshire, and Elsie G. Harrison, 20, Westway, Heswall.

**Dorill Confectionery, Limited.** (523460.) 3, Ashley Street, Nottingham. To carry on the business of manufacturers of and dealers in confectionery, etc. Nom. cap.: £5,000 in £1 shares. Dir.: E. Williamson, 1, Lynmouth Crescent, Bobbers Mill, Nottingham.

**Rocol, Limited.** (523465.) To carry on the business of importers, refiners, manufacturers of and dealers in oil, stearine, oleine, and fats of all kinds, etc. Nom. cap.: £100 in £1 shares. Dirs.: not named. Subs.: P. D. Johnson, 28, Windermere Road, Bennett Lane, Dewsbury (clk.), and D. F. Nichols, 126, Eden Crescent, Leeds, 4 (clk.).

**Barbacued Hot Dogs, Limited.** (523593.) Gaylord House, Rennie Street, Salford. To carry on business of manufacturers, distributors, and canners of foodstuffs, importers and exporters of and dealers in potted meats, sausages, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: P. C. Unger, 134a, Roe Lane, Southport; B. M. Unger, 4, Selworthy Road, Southport; Rose Unger, and Betty Unger.

**Hodson Company (Cordials), Limited.** (523752.) 141, Streatham High Road, London, S.W.16. To carry on business of manufacturers of and dealers in cordials, minerals, ice cream, and confectionery. Nom. cap.: £1,000 in £1 shares. Dirs.: D. C. W. Rutter and Mrs. G. E. Rutter, 18, Harborough Road, London, S.W.16.

**St. Ives Canneries, Limited.** (523761.) 40, Pall Mall, London, S.W.1. To manufacture, preserve, can, bottle, or otherwise manipulate or deal in, fish, meats, poultry, game, groceries, confectioneries and foods and provisions of all kinds. Nom. cap.: £1,100 in 1,000 ord. "A" shares of £1 and 1,000 "B" ord. shares of 2s. each. Dirs.: K. G. Pelmore, Scotswood, Hindhead, Surrey, and H. A. A. Heynes, Busbridge Lakes House, Godalming, Surrey.

**K.D.B. Manufacturing Company, Limited.** (523918.) The New Bakery, Sheppard Road, Doncaster. To carry on business of bakers and manufacturers of and dealers in biscuits, and farinaceous compounds. Nom. cap.: £400 in £1 shares. Dirs.: A. R. Brown, 22, Thomson Avenue, Doncaster; R. Bate, The Fisheries, Chequer Avenue, Doncaster; N. Darke and M. J. Killourhy.

**East Coast Meat Company, Limited.** (523940.) 114, Queen Mary Avenue, Cleethorpes, Lincs. Nom. cap.: £2,500 in £1 shares. Dirs.: S. L. Bull, 271, Grimsby Road, Cleethorpes; L. E. Gott, 6, Queens Parade, Cleethorpes; T. H. Babington; R. Richardson; L. Claybourn, and J. L. Smith.

**Gough and Davis, Limited.** (524000.) 16, Whitehorse Street, Baldock, Herts. To carry on business of plant bakers and confectioners. Nom. cap.: £1,000 in £1 shares. Dirs.: J. L. Gough, 8, Downfields Road, Welwyn Garden City, Herts.; T. W. Davies, 3, Raymonds Plain, Welwyn Garden City, Herts.; Mrs. D. E. Gough, and Mrs. A. A. Davies.

**Betaheith Food Stores, Limited.** (524211.) 5a, Leigham Court Road, London, S.W.16. To carry on business of manufacturers of and dealers in foods, food products, and general provisions. Nom. cap.: £1,800 in £1 shares. Dirs.: R. Bailey, 24, Church Dale Court, Havard Road, London, W.4; Mrs. D. Bailey, 106, Cat Hill, Barnet, Herts., and Miss F. M. Bailey, 68, Cat Hill, Barnet, Herts.

**Call Boy Confectionery, Limited.** (524213.) 110, Burnt Oak Broadway, Edgware, Middlesex. Nom. cap.: £100 in £1 shares. Permt. dirs.: A. F. Bishop, and Florence J. Bishop, 5, Credon Road, Plaistow, London, E.13.

**Sweets (Derby), Limited.** (524385.) 49-51, Shaftesbury Street, Derby. To carry on business of confectioners, manufacturers of and dealers in sweetmeats. Nom. cap.: £5,000 in £1 shares. Dirs.: A. Wilcox, 367, Shobnall Street, Burton-on-Trent; B. G. Wilcox and Mrs. M. M. Wilcox, 8, St. Paul's Street, Burton-on-Trent.

*From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.*

# FOOD MANUFACTURE

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